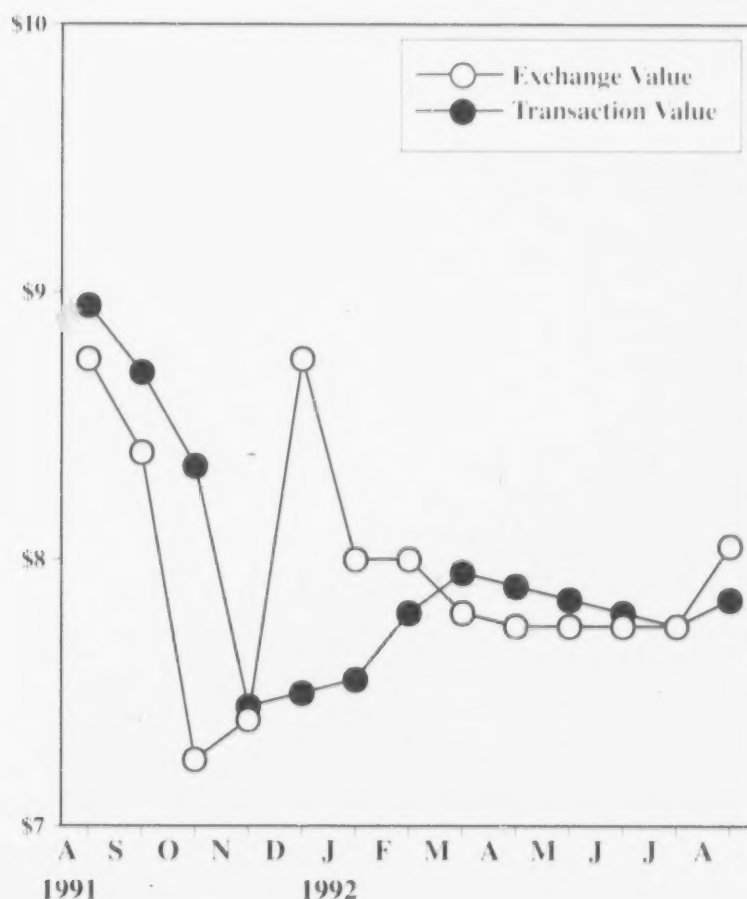


NUEXCO

Monthly Report

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NUEXCO

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• Taiwan's Nuclear Program Taiwan has one of the world's fastest growing economies and presently relies on nuclear power to supply more than one-third of its electricity requirements. The country operates six reactors at three stations, and the government recently approved plans for construction of a fourth nuclear power station.	
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CONCORD/NUEXCO is pleased to announce that Dr. Boris V. Nikipelov of the Ministry of Atomic Energy and Industry (Minatom) of the former Soviet Union has become a founding member of CONCORD's newly established Technology Advisory Committee. Dr. Nikipelov previously was First Deputy Minister of Minatom. This new committee will focus on CONCORD's numerous advanced technology-based industries, including those being developed in conjunction with various organizations in the Commonwealth of Independent States (CIS). Dr. Nikipelov's expertise in nuclear technology and isotopes, as well as his in-depth knowledge of high technology development in the countries of the former Soviet Union will be a valuable asset to the Committee. CONCORD/NUEXCO is proud to have Dr. Nikipelov participate in this activity, and know that his broad scope of knowledge and his experience in transforming scientific achievement into economic reality, will enable the Technology Advisory Committee to become a valuable resource for the CONCORD group. The Technology Advisory Committee will interface regularly with CONCORD's International Advisory Committee.



The following is a press announcement released by NUEXCO and General Atomics on September 10.

Taking issue with efforts underway in the United States to impose special duties on the import of uranium produced in the Commonwealth of Independent States (CIS), General Atomics and NUEXCO announced today their common support for the duty-free trade of uranium and commercial uranium products.

Mr. Neal Blue, Chairman of General Atomics, said, "The free flow of goods between nations is a two-way street which stimulates and strengthens the economies of all countries. Discriminatory trade practices directed against the CIS are not consistent with the objectives of integrating the CIS into the free world economic systems and encouraging the prompt conversion of weapons stockpiles into fuel for commercial reactors."

Mr. Oren Benton, Chairman of NUEXCO, concurred by stating, "The free trade of uranium will significantly benefit US consumers of electric power while providing the nations of the CIS with critically needed foreign exchange from the sale of their uranium. Free trade is also the most effective means of encouraging the CIS in its efforts to convert nuclear weapons stockpiles into commercial reactor fuel."

General Atomics and NUEXCO's parent, CONCORD, have each been active in acquiring uranium reserves throughout the world, including acquisition by General Atomics of the former Chevron uranium properties and CONCORD's acquisition of a joint venture interest in Energy Fuels, previously the largest US uranium producer. NUEXCO, the world's largest uranium trading organization, is headquartered in Denver, Colorado. General Atomics, also active at various levels of the nuclear fuel cycle, is headquartered in San Diego, California. General Atomics subsidiary, Sequoyah Fuels Corp., is one of the two US converters of uranium used in the nuclear fuel fabrication process.

The companies also announced that Mr. James Graham, President and Chief Operating Officer of NUEXCO, will join General Atomics as the new head of its uranium acquisition, marketing, and storage activities. Jim Graham's duties will include liaison with NUEXCO, in an effort to identify areas of mutual interest. Mr. Graham's responsibilities within NUEXCO will be reassumed by Earl Hoellen as part of his Chief Executive Officer responsibilities.

MARKET REVIEW

Market Values Summary

NUEXCO Market Values	This Report August 31, 1992	Last Report July 31, 1992	12 Months Ago August 31, 1991
EXCHANGE VALUE¹	\$8.05 / lb equivalent U₃O₈	\$7.75	\$8.75
UF₆ VALUE²	\$24.25 / kg U as UF₆	\$23.50	\$26.25
LOAN RATE³	3.0% / annum	3.0%	3.5%
CONVERSION VALUE⁴	\$1.50 / lb U as UF₆	\$1.50	\$1.60
SWU VALUE⁵ (0.3 % tails assay)	\$66 / SWU	\$66	\$67
TRANSACTION VALUE⁶	\$7.85 / lb equivalent U₃O₈	\$7.75	\$8.95
Transactions	28	35	26
Months	3	3	3
Millions of Pounds	8.3	8.5	5.9

DEFINITIONS

¹ The **Exchange Value** is NUEXCO's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.

² The **UF₆ Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.

³ The **Loan Rate** is NUEXCO's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.

⁴ The **Conversion Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.

⁵ The **SWU Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.

⁶ The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:

- a) Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;
- b) At least ten transactions;
- c) Transactions involving a sum total of at least 2 million pounds equivalent U₃O₈.

DERIVATIONS AND COMMENTS

- All **Market Values** are expressed in terms of US\$.
- All **Market Values** are based on:
 - Data from recently completed transactions.
 - Data from pending transactions.
 - Firm bids to buy or borrow, and firm offers to sell or lend.
 - Prices purchasers or rates borrowers have expressed a willingness to pay, but for which NUEXCO is not aware of firm bids to buy or borrow and prices sellers or rates lenders have expressed a willingness to accept, but for which NUEXCO is not aware of firm offers to sell or lend.
- Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these **Market Values**.
- In the determination of prices, NUEXCO does not consider charges for transportation other than that customarily provided by suppliers.
- The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
- For the **SWU Value**, NUEXCO converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent (‰) ²³⁵U and a product assay of 3.0 weight-percent ²³⁵U, assuming feed costs corresponding to the NUEXCO **Exchange Value** and **Conversion Value** determined as of the same date.
- In calculating the **Transaction Value**, NUEXCO does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future **Exchange Values** or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it can not currently be determined.
- The sample time for the **Transaction Value** is extended as necessary to satisfy the minima for the number of transactions and quantity of material. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

MARKET REVIEW

AUGUST MARKET REVIEW

(as of August 31, 1992)

OVERVIEW

Increased demand, primarily as a result of producer buying activity, led to an upturn in the uranium market in August. The Exchange Value rose \$0.30, to \$8.05 per pound U₃O₈, and the UF₆ Value increased by \$0.75, to \$24.25 per kgU as UF₆.

Although the average quantity per transaction was smaller in August compared to transactions concluded in June and July, the market remained fairly active, with ten near-term transactions reported. The nine concentrates sales and one natural UF₆ sale totalled nearly 2.0 million pounds equivalent U₃O₈ (Table 1). Year-to-date, 92 uranium transactions have been reported, totalling 29.7 million pounds equivalent U₃O₈. If the market remains near its present level of activity in September, total sales volume for 1992 will surpass in the third quarter the total volume achieved in all of 1991 (30.0 million pounds).

The Loan Rate remained unchanged at 3.0 percent per annum. Two loans were reported, totalling more than 400 thousand pounds equivalent U₃O₈. The Conversion Value also was unchanged, remaining at \$1.50 per pound U as UF₆. No conversion sales were reported.

The SWU Value remained \$66 per SWU. No near-term enrichment transactions were reported. However, two long-term sales were concluded in August, in which utilities purchased a total approaching 400 thousand SWU for delivery from 1994 through 2001.

NATURAL URANIUM AND CONVERSION

After four successive months at \$7.75 per pound, the **Exchange Value** rose \$0.30, to **\$8.05** per pound U₃O₈ on August 31, marking the first time in 1992 that the Exchange Value has exceeded eight dollars per pound. (The most recent price spike reached \$8.75 per pound on December 31, 1991). Uranium demand increased during August, as several producers entered the market to purchase material to fill future deliveries under their existing long-term contracts. Due to the uncertainty in the market created by the anti-dumping petition filed against the former Soviet Union, producers may have begun buying aggressively because they felt that current prices were advantageous.

Nine near-term concentrates transactions were reported from August, totalling more than 1.7 million pounds equivalent U₃O₈. Producers were buyers in eight of the nine transactions, with the other purchase made by an intermediary. Transactions concluded early in the month had prices near the July 31 Exchange Value, but prices gradually rose during the month to levels at or near the August 31 Exchange Value.

Although the market remained fairly active in August, smaller average transaction size resulted in a total monthly volume that was noticeably lower compared to June and July. The average uranium purchase quantity in August equalled roughly 200 thousand pounds, compared to more than 500 thousand pounds per transaction in June, and 350 thousand pounds in July. August's lower average transaction quantity can be attributed to changing producer buying tendencies. Producer buying activity has evolved

Table 1
NEAR-TERM URANIUM SALES SUMMARY

	August 1992		Year-to-Date	
	No. of Sales	Volume ¹	No. of Sales	Volume ¹
Concentrates	9	1.7	62	18.7
Natural UF ₆	1	0.3	18	5.7
EUP	0	0.0	12	5.3
Total ²	10	2.0	92	29.7

¹ Million pounds equivalent U₃O₈
² Due to independent rounding, columns may not equal total.

MARKET REVIEW

over the past year or two: producers' current tendency is to buy smaller lots more frequently, in order to match specific delivery requirements under long-term contracts. This strategy permits the producer to lower its market risk when buying on the spot market to fulfill delivery commitments for contracts with market-related pricing terms.

Prices in the UF₆ market followed price movements in the concentrates market, and the August 31 **UF₆ Value** climbed \$0.75, to **\$24.25** per kgU as UF₆. Uranium hexafluoride is now selling at a slight discount (\$0.09) to the sum of the value of its components. Only one natural UF₆ transaction was reported, in which an intermediary purchased a moderate quantity of UF₆ for delivery near the end of this year.

Three transactions are reported in the **long-term uranium market**. US utilities made all three purchases: one involved concentrates; one, natural UF₆; and one, enriched uranium product (EUP). Together, the transactions totalled almost

1.7 million pounds equivalent U₃O₈ for delivery during the period 1992 through 1997.

The **Transaction Value** reversed its steady downward trend of the past four months, and rose \$0.10, to **\$7.85** per pound U₃O₈. August's higher-priced sales led to the increase. The August 31 Transaction Value was based on 28 transactions over three months involving 8.3 million pounds equivalent U₃O₈.

Active uranium supply increased by 1.2 million pounds during August, to **8.2** million pounds equivalent U₃O₈. New demand throughout the month was filled as it emerged, and at month-end, total **active uranium demand** had risen by only 420 thousand pounds, to **1.3** million pounds equivalent U₃O₈. Since active supply did not increase as much proportionately, the **supply/demand ratio** fell to **6.3**.

The **Loan Rate** remained unchanged at **3.0** percent per annum. Loan supply is nearly six times larger than loan demand (**Table 2**), even though activity has been relatively low in the market. Two uranium loans were reported from August: intermediaries borrowed a total of more than 400 thousand pounds equivalent U₃O₈ in the form of concentrates from a producer and a utility.

The **Conversion Value** also was unchanged, remaining at **\$1.50** per pound U as UF₆ for the third consecutive month. The conversion market remained quiet in August: no conversion transactions were reported.

Table 2
NEAR-TERM SUPPLY/DEMAND SUMMARY

	Active Supply ¹	Active Demand ¹
• Uranium (thousand lbs equivalent U ₃ O ₈)	8,240	1,305
• Supply/Demand Ratio:	6.3	
• Loan (thousand lbs equivalent U ₃ O ₈)	7,250	1,250
• Conversion (thousand lbs U as UF ₆)	3,300	620
• SWU (thousand SWUs)	1,085	50

¹ Supply and Demand tables in the Market Review section of this Report provide details for each category.

MARKET REVIEW

ENRICHMENT SERVICES AND ENRICHED URANIUM PRODUCT

The **SWU Value** was unchanged at **\$66** per SWU. Demand for spot enrichment remains weak, and sellers have not been very aggressive; no near-term transactions were reported from August. The secondary enrichment market has been fairly quiet recently, although one utility

entered the market near the end of August, and several other utilities are expected to enter within the next few months. Two long-term enrichment sales were reported. In one, a utility purchased EUP containing a moderate quantity of SWU and feed for delivery in 1994 and 1995. In the other transaction, a US utility purchased a fairly large quantity of SWU for delivery during the period 1996 through 2001.

Table 3
ENRICHMENT PRICES
(August 31, 1992)

Prices	This Month Report 289	Last Month Report 288	12 Months Ago Report 277
NUEXCO SWU Value (\$US per SWU)	66	66	67
US DOE SWU prices: (\$US per SWU)			
USC	121.50 ¹	121.50 ¹	117.85 ²
AFC	153.00 ³	153.00 ³	153.00 ³
Requirements	157.00 ³	157.00 ³	157.00 ³
Incentive Price (IP2)	104.67 ⁴	104.67 ⁴	100.68 ⁵
Calculated worth of enriched UF₆: (\$US per KgU as UF ₆)			
2.0 % ²³⁵ U	213	209	223
2.5 % ²³⁵ U	298	294	311
3.0 % ²³⁵ U	386	381	403
3.5 % ²³⁵ U	476	470	496
4.0 % ²³⁵ U	567	560	591
4.5 % ²³⁵ U	660	652	687

¹ Effective 10/1/91.

² Effective 10/1/89 to 9/30/91.

³ Effective since 10/1/84.

⁴ Provisional IP2 for FY92: Effective 10/1/91 to 9/30/92, for up to 30% of annual requirements.

⁵ IP2: Effective 10/1/90 to 9/30/91, for up to 30% of annual requirements.

⁶ Calculated using the NUEXCO Exchange Value, Conversion Value, SWU Value and 0.30 %²³⁵U tails assay.

RECENT TRANSACTIONS

Uranium Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U ₃ O ₈)	Price Within Percentage Range of Current Exchange or UF ₆ Value	Buyer	Seller	Remarks
5520A	1994-1995	301-600	See remarks	Utility	Intermediary	Contained in EUP
5523	1992-1997	601-1,000	See remarks	Utility	R	UF ₆ , Base escalated
5524	1993	101-300	90-97	Producer	Intermediary	
5529	1992	50-100	98-102	Producer	Intermediary	
5530	1993	301-600	98-102	Producer	Intermediary	
5531	1992	101-300	98-102	Intermediary	R	UF ₆
5532	1993	101-300	98-102	Intermediary	Intermediary	
5533	1992	101-300	98-102	Producer	Intermediary	
5534	1992	Less than 50	98-102	Producer	Intermediary	
5536	1992-1993	101-300	98-102	Producer	Intermediary	
5538	1992	101-300	98-102	Producer	Producer	
5539	1992	301-600	98-102	Producer	Intermediary	
5541	1992-1997	600-1,000	See remarks	Utility	Producer	Price related to market

R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality.

¹ Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information.

² The ranges *Below 90, 90-97, 98-102, 103-110, Above 110*, represent percentages (rounded to whole numbers) of the appropriate current Exchange Value or UF₆ Value. The endpoints of each range are included within that range.

MARKET REVIEW

RECENT TRANSACTIONS

Natural Uranium Loans ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U ₃ O ₈)	Price Within Percentage Range ² of Current Loan Rate	Borrower	Lender	Remarks
5535	1992	101-300	103-110	Intermediary	Producer	
5540	1992	101-300	98-102	Intermediary	Utility	
Conversion Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds of U equivalent)	Price Within Percentage Range ² of Current Conversion Value	Buyer	Seller	Remarks
<i>No conversion sales are reported.</i>						
Enrichment Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand SWU)	Price Within Percentage Range ² of Current SWU Value	Buyer	Seller	Remarks
5520B	1994-1995	50-100	See remarks	Utility	Intermediary	Contained in EUP
5521	1996-2001	301-600	See remarks	Utility	Enricher	Series of fixed prices
R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality. ¹ Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information. ² The ranges <i>Below 90</i>, <i>90-97</i>, <i>98-102</i>, <i>103-110</i>, <i>Above 110</i>, represent percentages (rounded to whole numbers) of the appropriate current Market Value. The endpoints of each range are included within that range. ³ If tails assay is unknown or unspecified, NUEXCO's calculation of SWU quantity assumes 0.30 % tails assay. ⁴ Prices are usually normalized to 0.30 % tails assay. When prices and SWU values are expressed as discounts from a reference price (e.g., \$ dollars less than DOE's USC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.						

MARKET REVIEW

SUPPLY AND DEMAND

Uranium Supply				
NUEXCO Project Number	Quantity (Thousand Pounds equivalent U ₃ O ₈)		Delivery Period	Remarks
	Spot or Near-term	Intermediate or Long-term		
AVAILABLE FOR SALE:				
ACTIVE				
90-1078A	235	—	1992-1993	UF ₆ e
91-1505	1,250	—	1992-1993	
91-1507	500	—	1992	
91-1511	1,305	—	1992	UF ₆ /UF ₆ e
91-1512*	785	—	1993	UF ₆
92-1141*	200	—	1992	
92-1194	200	—	1992	
92-1201A	840	—	1993	UF ₆ e
92-1257A*	1,510	—	1992-1993	UF ₆ e
92-1501A	915	—	1992	UF ₆ e
92-1512*	500	—	1993	
91-1268	—	600 per year	1992-1999	
92-1129	—	2,600 per year	1993-1999	
92-1185	—	2,600 per year	1993-1999	
92-1261*	—	520 per year	1993-2000	
92-1513*	—	1,300 per year	1992-1999	
TOTAL	8,240			
INACTIVE	2,800			
AVAILABLE TO LOAN:				
ACTIVE				
92-1072*	3,100	—	1992	UF ₆
92-1074	1,000	—	1992	
92-1206*	500	—	1992	
92-1258*	1,250	—	1993	
92-1503*	1,000	—	1992	
92-1515*	400	—	1992	
TOTAL	7,250			
INACTIVE	1,610			
* New or revised since last month.				
¹ For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.				
² For delivery beyond one year, measured from the date of this Report.				
Active Projects reclassified as Inactive since last month: 92-1509, 92-1195				
Active Projects removed since last month: 92-1214				

MARKET REVIEW

SUPPLY AND DEMAND

Uranium Demand				
NUEXCO Project Number	Quantity (Thousand Pounds equivalent U ₃ O ₈)		Delivery Period	Remarks
	Spot or Near-term	Intermediate or Long-term		
INQUIRIES TO PURCHASE:				
ACTIVE				
92-1152A	15	—	1993	UF ₆ e
92-1227	270	—	1992	U ₃ O ₈ /UF ₆
92-1231*	25	—	1992	U ₃ O ₈ /UF ₆
92-1255*	125	—	1992-1993	
92-1256*	190	—	1992	
92-1259*	150	—	1993	U ₃ O ₈ /UF ₆
92-1264A*	30	—	1992-1993	UF ₆ e
92-1514*	500	—	1993	U ₃ O ₈ /UF ₆
91-1184	—	350 per year	1993-1997	
92-1199	—	2,000	1992-1999	
92-1223	—	400 per year	1997-2000	U ₃ O ₈ /UF ₆
92-1226	—	300 per year	1994-1996	
92-1235*	—	500 per year	1995-2000	U ₃ O ₈ /UF ₆
92-1245*	—	1,960	1993-2000	UF ₆
92-1252*	—	4,000	1995-2000	
92-1253*	—	100 per year	1996-2003	
TOTAL	1,305			
INACTIVE				
	1,785			
INQUIRIES TO BORROW:				
ACTIVE				
92-1505	500	—	1992	
92-1511	750	—	1992	
TOTAL	1,250			
INACTIVE				
	None reported			

* New or revised since last month.

¹ For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

² For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: none

Active Projects removed since last month: 91-1197, 92-1164A, 92-1225

SUPPLY AND DEMAND

Conversion Supply and Demand

Conversion Supply and Demand				
NUEXCO Project Number	Quantity (Thousand Pounds U as UF ₆)		Delivery Period	Remarks
	Within 3 Years	Beyond 3 Years		
AVAILABLE FOR SALE:				
ACTIVE				
91-1500	400	—	1992	
91-1501	1,100	—	1992	
92-1190*	300	—	1993	
92-1507	500	—	1992	
92-1516*	1,000	—	1992	
TOTAL	3,300			
INACTIVE	None reported		—	
INQUIRIES TO PURCHASE:				
ACTIVE				
91-1275	620	—	1992-1993	
92-1178	—	3,300 per year	1992-1995	
TOTAL	620			
INACTIVE	None reported			
* New or revised since last month. † Measured from the date of this Report. Active Projects reclassified as Inactive since last month: none Active Projects removed since last month: none				

MARKET REVIEW

SUPPLY AND DEMAND

SWU Supply and Demand				
NUEXCO Project Number	Quantity (Thousand Pounds equivalent U.Os)		Delivery Period	Remarks
	Spot or Near-term	Intermediate or Long-term		
AVAILABLE FOR SALE:				
ACTIVE				
90-1078B	75	—	1992-1993	UF ₆ e
91-1509	200	—	1992	
91-1515	100	—	1992	
92-1201B	180	—	1993	UF ₆ e
92-1257B*	150	—	1992-1993	UF ₆ e
92-1501B	130	—	1992	UF ₆ e
92-1124	250	250 per year	1992-1994	
TOTAL	1,085			
INACTIVE				
	50			
INQUIRIES TO PURCHASE:				
ACTIVE				
92-1152B	5	—	1993	UF ₆ e
92-1236*	40	—	1993	
92-1264B*	5	—	1992-1993	UF ₆ e
90-1196	—	60 per year	1995 on	
91-1152	—	2,700	1995-2001	
92-1016	—	170 per year	1996-2006	
TOTAL	50			
INACTIVE				
	140			
* New or revised since last month.				
1 For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.				
2 For delivery beyond one year, measured from the date of this Report.				
Active Projects reclassified as Inactive since last month: none				
Active Projects removed since last month: 92-1164B				

MARKET REVIEW

MARKET VALUES EXPRESSED IN SELECTED CURRENCIES¹

Australia to Hungary										
	Australia (dollar)	Belgium (franc)	Canada (dollar)	China (renminbi)	CSFR (koruna)	EC (ecu)	Finland (markka)	France (franc)	Germany (mark)	Hungary (forint)
EXCHANGE VALUE										
<i>per pound equivalent U₃₀ as Concentrates</i>										
This Month (Aug 31, 1992)	11.25	232.93	9.62	43.75	210.10	5.58	31.13	38.46	11.29	597.71
Last Month (July 31, 1992)	10.41	235.42	9.16	42.39	208.24	5.61	31.35	38.60	11.43	589.47
12 Months Ago (Aug 31, 1991)	11.15	314.52	9.99	46.79	—	7.42	37.11	51.90	15.29	—
<i>per kg U as Concentrates</i>										
This Month (Aug 31, 1992)	29.25	605.56	25.01	113.74	546.23	14.52	80.92	99.99	29.34	1,554
Last Month (July 31, 1992)	27.07	612.04	23.82	110.21	541.38	14.58	81.50	100.34	29.71	1,532
12 Months Ago (Aug 31, 1991)	29.00	817.69	25.97	121.64	—	19.30	96.47	134.93	39.74	—
UF₆ VALUE										
<i>per kg U as UF₆</i>										
This Month (Aug 31, 1992)	33.89	701.68	28.98	131.79	632.92	16.82	93.77	115.86	34.00	1,801
Last Month (July 31, 1992)	31.58	713.85	27.78	128.55	631.45	17.00	95.06	117.03	34.66	1,787
12 Months Ago (Aug 31, 1991)	33.46	943.57	29.97	140.36	—	22.27	111.32	155.70	45.86	—
TRANSACTION VALUE										
<i>per pound equivalent U₃₀ as Concentrates</i>										
This Month (Aug 31, 1992)	10.97	227.14	9.38	42.66	204.88	5.45	30.35	37.50	11.01	582.86
Last Month (July 31, 1992)	10.41	235.42	9.16	42.39	208.24	5.61	31.35	38.60	11.43	589.47
12 Months Ago (Aug 31, 1991)	11.41	321.71	10.22	47.86	—	7.59	37.96	53.09	15.64	—
<i>per kg U as Concentrates</i>										
This Month (Aug 31, 1992)	28.52	590.52	24.39	110.91	532.66	14.16	78.91	97.50	28.61	1,515
Last Month (July 31, 1992)	27.07	612.04	23.82	110.21	541.38	14.58	81.50	100.34	29.71	1,532
12 Months Ago (Aug 31, 1991)	29.66	836.38	26.56	124.42	—	19.74	98.68	138.02	40.65	—
CONVERSION VALUE										
<i>per pound U as UF₆</i>										
This Month (Aug 31, 1992)	2.10	43.40	1.79	8.15	39.15	1.04	5.80	7.17	2.10	111.38
Last Month (July 31, 1992)	2.02	45.57	1.77	8.21	40.31	1.09	6.07	7.47	2.21	114.09
12 Months Ago (Aug 31, 1991)	2.04	57.51	1.83	8.56	—	1.36	6.79	9.49	2.80	—
<i>per kg U as UF₆</i>										
This Month (Aug 31, 1992)	4.62	95.69	3.95	17.97	86.31	2.29	12.79	15.80	4.64	245.54
Last Month (July 31, 1992)	4.44	100.45	3.91	18.09	88.86	2.39	13.38	16.47	4.88	251.53
12 Months Ago (Aug 31, 1991)	4.50	126.79	4.03	18.86	—	2.99	14.96	20.92	6.16	—
SWU VALUE										
<i>per SWU at 0.30% ²³⁵U Tails Assay</i>										
This Month (Aug 31, 1992)	92.24	1,910	78.87	358.69	1,723	45.79	255.20	315.32	92.53	4,901
Last Month (July 31, 1992)	88.69	2,005	78.03	361.02	1,773	47.75	266.97	328.69	97.33	5,020
12 Months Ago (Aug 31, 1991)	85.40	2,408	76.49	358.26	—	56.85	284.14	397.41	117.05	—

¹ Calculated using currency exchange rates for the last business day of the month, as published in *The Wall Street Journal*.

MARKET REVIEW

MARKET VALUES EXPRESSED IN SELECTED CURRENCIES¹

Italy to United States	Italy (lira)	Japan (yen)	Netherlands (guilder)	S. Africa (comm. rand)	S. Korea (won)	Spain (peseta)	Sweden (krona)	Switzerland (franc)	Taiwan (dollar)	UK (pound)	USA (dollar)
EXCHANGE VALUE											
<i>per pound equivalent U.O.s as Concentrates</i>											
This Month (Aug 31, 1992)	8,617	989.79	12.72	22.04	6,325	733.02	41.28	10.05	199.88	4.05	8.05
Last Month (July 31, 1992)	8,643	985.00	12.89	21.43	6,102	728.66	41.51	10.22	191.35	4.02	7.75
12 Months Ago (Aug 31, 1991)	11,404	1,197	17.21	25.14	6,407	951.29	55.45	13.33	231.18	5.21	8.75
<i>per kg U as Concentrates</i>											
This Month (Aug 31, 1992)	22,402	2,573	33.08	57.29	16,443	1,906	107.32	26.12	519.65	10.52	20.93
Last Month (July 31, 1992)	22,469	2,561	33.50	55.72	15,865	1,894	107.92	26.57	497.46	10.46	20.15
12 Months Ago (Aug 31, 1991)	29,647	3,112	44.75	65.37	16,657	2,473	144.16	34.65	601.01	13.54	22.75
UF₆ VALUE											
<i>per kg U as UF₆</i>											
This Month (Aug 31, 1992)	25,958	2,982	38.33	66.38	19,052	2,208	124.36	30.26	602.13	12.20	24.25
Last Month (July 31, 1992)	26,207	2,987	39.08	64.99	18,504	2,209	125.87	30.99	580.22	12.20	23.50
12 Months Ago (Aug 31, 1991)	34,211	3,591	51.64	75.43	19,221	2,854	166.35	39.98	693.53	15.63	26.25
TRANSACTION VALUE											
<i>per pound equivalent U.O.s as Concentrates</i>											
This Month (Aug 31, 1992)	8,403	965.20	12.41	21.49	6,168	714.81	40.26	9.80	194.91	3.95	7.85
Last Month (July 31, 1992)	8,643	985.00	12.89	21.43	6,102	728.66	41.51	10.22	191.35	4.02	7.75
12 Months Ago (Aug 31, 1991)	11,664	1,224	17.61	25.72	6,553	973.04	56.72	13.63	236.46	5.33	8.95
<i>per kg U as Concentrates</i>											
This Month (Aug 31, 1992)	21,846	2,509	32.26	55.87	16,034	1,858	104.66	25.47	506.74	10.26	20.41
Last Month (July 31, 1992)	22,469	2,561	33.50	55.72	15,865	1,894	107.92	26.57	497.46	10.46	20.15
12 Months Ago (Aug 31, 1991)	30,325	3,183	45.78	66.86	17,037	2,530	147.45	35.44	614.74	13.85	23.27
CONVERSION VALUE											
<i>per pound U as UF₆</i>											
This Month (Aug 31, 1992)	1,606	184.43	2.37	4.11	1,179	136.59	7.69	1.87	37.24	0.75	1.50
Last Month (July 31, 1992)	1,673	190.65	2.49	4.15	1,181	141.03	8.03	1.98	37.04	0.78	1.50
12 Months Ago (Aug 31, 1991)	2,085	218.88	3.15	4.60	1,172	173.95	10.14	2.44	42.27	0.95	1.60
<i>per kg U as UF₆</i>											
This Month (Aug 31, 1992)	3,540	406.61	5.23	9.05	2,598	301.12	16.96	4.13	82.11	1.66	3.31
Last Month (July 31, 1992)	3,688	420.30	5.50	9.15	2,604	310.92	17.71	4.36	81.65	1.72	3.31
12 Months Ago (Aug 31, 1991)	4,597	482.54	6.94	10.14	2,583	383.50	22.35	5.37	93.19	2.10	3.53
SWU VALUE											
<i>per SWU at 0.30% ²³⁵U Tails Assay</i>											
This Month (Aug 31, 1992)	70,649	8,115	104.31	180.67	51,854	6,010	338.46	82.37	1,639	33.19	66.00
Last Month (July 31, 1992)	73,603	8,388	109.74	182.52	51,969	6,205	353.51	87.03	1,630	34.26	66.00
12 Months Ago (Aug 31, 1991)	87,319	9,166	131.81	192.53	49,059	7,284	424.59	102.04	1,770	39.88	67.00

¹ Calculated using currency exchange rates for the last business day of the month, as published in *The Wall Street Journal*.

RECENT DEVELOPMENTS

USA

Anti-Dumping Decision Approaches

Some of the uncertainty surrounding the uranium anti-dumping investigation could be resolved by mid-October. The Department of Commerce (DOC) is scheduled to render its final determination on October 16, and that date is driving the timeline described herein.

It is public knowledge that settlement negotiations involving DOC and some of the six Republics of the Commonwealth of Independent States (CIS) named in the investigation (Russia, Uzbekistan, Kazakhstan, Ukraine, Tajikistan, and Kyrgyzstan) have been underway for several weeks, but the outcome remains in doubt. Four types of settlement are permitted under the statute:

- 1) Termination of the investigation upon withdrawal of petition.
- 2) Suspension of the investigation upon acceptance of an agreement to eliminate completely sales at less than fair value or to cease exports of merchandise.
- 3) Suspension of the investigation upon acceptance of an agreement eliminating injurious effects.
- 4) Suspension of the investigation upon acceptance of a quantitative restraint (quota) under the special rule for non-market economy (NME) countries.

All four possibilities present difficulties, but DOC counsel has offered the opinion, for the public record, that "only the settlement option that Congress crafted specifically for non-market economies such as the former Soviet Republics appears capable of settling the investigation. This would require neither reference data from the former Soviet Republics nor the consent of the U.S. industry". Such an agreement would have to be determined (by DOC) to be in the public interest and effectively monitorable; it also would have to "prevent imports that come in under the quota from undercutting or suppressing the prices of domestic producers."

DOC counsel also stated this type of agreement would avoid two key legal hurdles that could confront the other

ANTI-DUMPING PETITION TIMELINE OF UPCOMING EVENTS

- Sept 16** — Draft settlement agreement, if any, should be issued to petitioners, respondents, and interested parties.
- Sept 16** — Case briefs submitted to Department of Commerce (DOC).
- Sept 23** — Rebuttal briefs submitted to DOC.
- Oct 2** — DOC oral hearing.
- Oct 5** — International Trade Commission (ITC) staff report.
- Oct 16** — DOC final determination. If negative, the investigation terminates.
- Oct 20** — ITC oral hearing, if the DOC determination was affirmative.
- Dec 1** — Final ITC determination. If negative, investigation ends.
- Dec 7** — If ITC final determination is affirmative, final dumping order issued by DOC.

RECENT DEVELOPMENTS

types of settlements. "First, the independent states would not have to adjust their prices based on the very high BIA [best information available] margins anticipated in the preliminary determination. Second, the Department could enter into such an agreement with an NME country over the objections of the domestic industry." A significant uncertainty would still remain even if a suspension agreement is reached, either side could still require the continuation of the case to its conclusion.

Absent a settlement, DOC is scheduled to issue its final determination by October 16. If the DOC decision

is affirmative (that is, if it rules dumping has taken place), the International Trade Commission (ITC) has 45 days, until December 1, to determine if the imports have caused or threaten to cause material injury to the US uranium industry. If the ITC determination finds injury or threat of injury, DOC will issue a final dumping order by December 7, instructing the US Customs Service to collect anti-dumping duties in accordance with the final DOC determination. The final duties are reviewable in a subsequent proceeding, normally within one year.

RECENT DEVELOPMENTS

WASHINGTON FOCUS

by Linda L. Gunter

"How many days has it taken Congress to pass a National Energy Strategy?" President Bush asked rhetorically at the Republican National Convention in Houston. "Five hundred thirty-two days and still counting", he concluded. During his acceptance speech for the presidential nomination, he called on Congress to pass his energy strategy. Privately, many in the industry have been critical of the administration for not actively pushing the bill through Congress. Earlier in the month, President Bush invited chief executive officers of several energy companies to a meeting to discuss which issues he should support, as Congress prepares to go to conference on the energy bill (HR 776). Nuclear industry representatives pressed for a resolution to the spent fuel storage impasse at Yucca Mountain, but it remains to be seen whether a politically weakened President Bush will spend any of his limited political capital on the energy bill, as Congress considers the bill this autumn.

Energy Bill Conference Committee Appointed

Prior to the congressional recess for summer vacations and the Republican convention, Speaker of the House Tom Foley (D-WA) appointed conference committee representatives. As expected, Energy & Commerce Committee Chairman John Dingell (D-MI), Interior Committee Chairman George Miller (D-CA), and their committee representatives will play a key role in decisions on the nuclear provisions. On the Senate side, the conferees are members of the Senate Energy & Natural Resources Committee, and two members of the Environment & Public Works Committee (Senators Burdick and Chafee—who are not nuclear industry supporters). On the titles regarding uranium enrichment restructuring, in addition to the two House committees mentioned above, members of the Science, Space & Technology and Ways and Means committees will also play a role.

The largest subcommittee of the conference will negotiate Title XXIV of the House energy bill, which would prevent any ship carrying plutonium from using a US port (except for defense purposes) unless the container is certified by the US Nuclear Regulatory Commission (NRC). Forty-four members from four House committees were named, including members of Energy & Commerce, Interior, Foreign Affairs, and Merchant Marine & Fisheries. The Senate bill does not have any provisions on this issue, so Senate conferees will be free to negotiate as they see fit. The provisions of the House bill would require the NRC to establish additional standards in order to certify a container. When these provisions were first accepted in the Interior Committee, they caught much of the nuclear industry by surprise, for it appeared that anti-nuclear groups might have succeeded in wielding their influence on the transportation sector of the nuclear fuel cycle.

RECENT DEVELOPMENTS

NRC Fee Schedule

◇ As of August 24, the NRC increased its licensing and inspection fee schedule for FY 1992 by seven percent, in order to comply with its statutory obligation to recover 100 percent of its budget. The total amount expected to be recovered for FY 1992 is \$492.5 million. Nuclear utilities will pay approximately \$3.1 million this fiscal year, compared to approximately \$2.8 million last year. For FY 1992, base fees for materials licensees are as follows: those producing low-enriched uranium must pay \$683,000; converters, \$381,000 each; and fuel fabricators, a base fee of \$683,000. Uranium companies will be assessed a fee based upon the class into which they fall—uranium milling companies, solution mining companies, and other uranium recovery facilities. Sixty percent of the cost of regulating the uranium companies is allocated to uranium mills (Class I), which will be charged \$167,000; 20 percent is allocated to solution mining licensees who do not generate mill tailings (Class II)—\$73,200; the remaining 20 percent is allocated to other uranium recovery facilities—\$58,800. 

INDUSTRY BRIEFS

Cogema Announces Plan To Merge UG and Interuran

Late in August, Cogema released its plan to merge the German firms of Urangesellschaft (UG) and Interuran. The two companies, both majority-owned by Cogema, will be merged this September into one new company (still named UG), although some of Interuran's activities will be transferred to other Cogema subsidiaries. More than 69 percent of the new UG is held by Cogema's wholly owned German subsidiary, Cogema Uran Services GmbH. The remaining ownership is shared among German energy companies of PreussenElektra AG (10.3%), Steag (10.3%), Badenwerk AG (5%), and Energieversorgung Schwaben [EVS] (5%).

Bulgaria Announces 1994 Cessation of U Mining

Citing production costs in excess of US\$20 per pound U₃O₈, Bulgaria's Minister of Industry recently announced that Redki Metali, the state-owned uranium mining and milling company, will close operations by 1994. Attempts will be made to locate new jobs in other sectors of the economy for the 3,000 employees displaced by the closure.

Reactor Records and Milestones

Boiling water reactors (BWR) set two records in August: one for length of operation, the other for total generation. Philadelphia Electric Company's (PECO) Limerick 2, a 1,055-MWe BWR, set a BWR record for continuous operation of 424 days, as of the beginning of August. Since the unit is not scheduled for a refueling outage until January 1993, PECO hopes to surpass on October 21 the light-water reactor record of 502 days. That record was set on April 21, 1992, by Florida Power & Light Company's St. Lucie 2, a 839-MWe pressurized water reactor (PWR).

Japan Atomic Power Company's Tokai 2 set a world record for BWRs early in August when it surpassed the 100 billion gross kilowatt-hour (kWh) lifetime generation mark. The 1,056-MWe reactor began commercial operation in 1978. This generation mark is also a Japanese record for all reactor types.

Electricité de France's Fessenheim nuclear power station also achieved a milestone in August when it surpassed the 150 billion kWh lifetime generation mark. The two 880-MWe PWRs at the Fessenheim station went into commercial operation in 1977 and 1978.

Wyoming Governor Vetoes Fremont County MRS Study

Wyoming Governor Mike Sullivan vetoed Fremont County's request for a Department of Energy (DOE) grant for Phase IIA studies on the possible siting of a monitored retrievable storage (MRS) facility in the county. Citing the amount of time and money already spent by DOE simply on the suitability study for Yucca Mountain, the governor indicated his lack of confidence in DOE's ability to construct a permanent storage facility and thus to ensure that a Wyoming MRS not become a *de facto* permanent storage facility. He also questioned the necessity of an MRS versus continued storage at nuclear reactor stations.

Cleveland Electric to Build Permanent LLW Facility

In early August, Cleveland Electric Illuminating Co. (CEI) announced plans to start construction this fall of its own low-level radioactive waste (LLW) storage facility. The facility will be built at the Perry nuclear power station, at an estimated cost of \$1.7 million. CEI cited its uncertain future access to LLW storage facilities, and a potential savings of \$250,000 per year, as the motivating factors in its decision.

RECENT DEVELOPMENTS

PGE Board Reviews Trojan Economics, Sets 1996 Closure

Portland General Electric Company's (PGE) board of directors announced on August 10 that, following an economic review of the Trojan nuclear power plant (on a least-cost basis), the plant would be closed in 1996, 15 years short of the expiration of its NRC license. The four-year interval before shutting down the reactor will allow time for the development of new generating capacity (fired by natural gas and renewables) and new conservation measures. This was considered a better alternative than closing the 1,095-MWe PWR this year, as proposed by two measures in this November's Oregon state election. Three previous times Trojan has won such a public "vote of confidence" by defeating anti-Trojan referenda.

The PGE board determined that operation of Trojan beyond 1996 would require replacement of the steam generators, and such cost could not be justified. The board estimated that the 1996 closure would save \$100-200 million, compared to operating the plant until its license expired. The closure plan still must be approved by the Trojan owners' committee and the Oregon Public Utilities Commission.

Trojan becomes the third reactor in the last year now scheduled by their owners for premature closure. The other two are Yankee Atomic Electric Company's plant at Rowe, Massachusetts, which began operation in 1961, and San Onofre 1 (initial operation in 1968), operated by Southern California Edison Company.

Cogema Signs Cooperation Agreement with Russia's Minatom

On July 31 in Moscow, Russia, Cogema of France signed an agreement with the Ministry of Atomic Energy of the Russian Federation (Minatom) covering broad areas of the nuclear fuel cycle. A working group will be established to specify the fine details of the agreement. One of the clearest areas of cooperation will be Cogema's investment in Minatom's centrifuge enrichment plant at Tomsk. The plant will be upgraded to handle large volumes of reprocessed uranium, specifically that produced from Cogema's La Hague plant. The Tomsk plant primarily will need new equipment for front-end feed and bypass operations to handle the increased volume of reprocessed uranium.



Kozloduy 6 Restarted

Bulgaria's Kozloduy 6 (a 953-MWe VVER) was restarted on July 31 after a nearly three-month shutdown. Due to Bulgaria's troubled economy, the reactor's operator, the State Economic Union, has major financial constraints and was forced to conserve its uranium fuel for vital winter heating requirements by stopping power production during the summer.

Japanese Nuclear Project Breaks 27-Year Old Stalemate

Japan's plans for a 4,400-MWe nuclear power station on the coastline of the Aomori Prefecture finally took a step forward in August when a stalemate with local fishing cooperatives was resolved. A plan for four 1,100-MWe BWRs was proposed in 1965, but promptly ran into complications with local fishing cooperatives. Fishing cooperatives effectively control Japan's coastline through fishing rights, and Japan has few other sources of water to supply nuclear power stations. In this case, the local fishing cooperatives wanted financial compensation for giving up their rights to 52 square kilometers of coastal waters; the cooperatives initially refused to yield their rights at all. The lengthy deadlock was finally overcome on August 14 when the two largest cooperatives agreed to a compensation package worth US\$138.5 million (¥18 billion), equivalent to over US\$100,000 per co-op member. Agreements still must be reached with four other small cooperatives, but these agreements are expected to be concluded easily.

Following the fishing cooperative's agreements, the 9,000 residents of the village of Higashidori agreed in early September to a total compensation package (payments plus property taxes) of over US\$528 million (¥66 billion).

According to the plan for the new station, Tokyo Electric Power Company and Tohoku Electric Power Company each are to build two units. Station construction is now planned to begin in 1996, with initial reactor commissioning in 2002.

RECENT DEVELOPMENTS**EdF Orders New Civaux Reactor, Studies More**

In July, Electricité de France (EdF) president, Gilles Menage, announced that EdF's board of directors had approved the construction of a new nuclear power plant at its Civaux station. Additionally, the board approved studies of the feasibility of adding nuclear units at the St. Albans, Flamanville, or Penly stations. All three stations currently have two 1,300-MWe-class pressurized water reactors (PWR) in operation. (Penly 2 is currently in pre-commercial operation testing.) The Civaux station currently has only one unit, a 1,455-MWe PWR under construction and scheduled for commercial operation in 1997. The second unit, likely to be a twin to Civaux 1, will be ordered in 1993 and should reach commercial operation by 1999.

Japanese Report Outlines HLW Management

The Japanese Atomic Energy Commission recently issued a report entitled "High-Level Radioactive Waste (HLW) Management" that provides an initial outline of HLW management in Japan, and those responsible. According to the report, a new organization will be formed by the year 2000 that will be responsible for HLW management, as well as building and operating an HLW repository. The Japanese government will take responsibility for assuring that the geological disposal is performed according to regulations. Power Reactor and Nuclear Fuel Development Corporation will conduct geological and environmental research, and the country's utilities will fund the disposal costs.

Yankee Atomic Receives Possession-Only License

The US Nuclear Regulatory Commission has issued the Yankee Atomic Electric Company a "possession-only" license for the company's closed 167-MWe pressurized water reactor in Rowe, Massachusetts. The license will allow Yankee to lower its maintenance costs by eliminating its NRC user fees (\$500,000 in 1991) and emergency planning exercises, reducing the plant's staff by over 70 percent, and lowering its liability insurance costs. Yankee could begin decommissioning the plant in 1996 if the NRC approves its decommissioning plan by 1995, but may wait until the year 2000 in order for DOE repository issues to clear.

**Continued Operation
Approved
for 30-Year-Old Bradwell 2**

The United Kingdom's (UK) Nuclear Installations Inspectorate has approved the continued operation of Nuclear Electric's Bradwell 2 under the reactor's existing license. Originally expected to have economic lifetimes of 20 years, Nuclear Electric's Magnox reactors have been consistently improved, and Bradwell 2, a 123-MWe gas-cooled reactor, will be the UK's first reactor to surpass 30 years of operation. It is now planned for a total operational life of 36 years.

ANALYSIS & COMMENTARY

BLENDING RUSSIAN HEU

The topic of dismantling Russian nuclear weapons and converting the contained uranium into commercial nuclear fuel has received more media attention than any other issue involving the nuclear industry in recent weeks. On August 31, 1992, President George Bush announced that the US government and the Russian Federation had initialed an agreement for the US purchase of highly-enriched uranium (HEU) from dismantled Russian nuclear weapons. If a final agreement is signed and all of the hurdles to making the HEU available and usable can be overcome, the US Department of Energy (DOE) could begin supplying some of this material to its customer base by the latter part of this decade.

US-RUSSIAN AGREEMENT

The recently initialed agreement between the USA and Russia consists of two main parts. Part One indicates that both parties will begin negotiations to convert, as soon as practical, HEU from dismantled Russian nuclear weapons to low-enriched uranium (LEU) fuel for use in commercial nuclear reactors. It notes that appropriate measures need to be established to ensure that all applicable non-proliferation, physical security, material accounting and control, and environmental requirements are met.

Part Two of the agreement states that an implementing contract to accomplish the objectives in Part One should be signed within twelve months, and will allow the following:

- A minimum of 10 metric tons of HEU to be converted annually for the first five years and 30 metric tons per year thereafter.
- The purchase by the Department of Energy of HEU for conversion to LEU, and its sale for commercial purposes.
- The purchase by DOE of LEU diluted from HEU converted at facilities in Russia, for sale as commercial fuel once Russian facilities begin operation.
- Participation by the US private sector.
- Use by the Russian Federation of a portion of the proceeds from the HEU sales to upgrade the safety of nuclear reactors in the former Soviet Union.
- Use by the Russian Federation, at its discretion, of a portion of the proceeds from the HEU sales to finance construction and operation of HEU to LEU conversion facilities in Russia.

The present agreement, which still requires approval from both governments, states that all US funding for the HEU purchases will come from savings in DOE's enrichment operations. These purchases are envisioned at levels that would allow DOE to lower production costs at its enrichment facilities through reduced electricity demand. However, payment to Russia for its HEU may not occur until the cost (including savings) of the converted LEU is calculated and payments for delivery are received from DOE customers.

The agreement represents a major step forward in the area of weapons reduction and demonstrates a strong intent on the part of both governments to find a solution for disposal of HEU from Russia's nuclear weapons. As a result of the US-Soviet arms-reductions treaties signed in the past few years, Russia has at least 500 metric tons of HEU that could be made available from weapons being dismantled. [Russia is reported to have more than 1,000 metric tons of HEU contained in weapons inventory.] The issue of disposition of an equivalent amount of HEU from dismantlement of US weapons has not been addressed, but could, if politically feasible, represent an opportunity to add billions of dollars to the US Treasury, as well as allow possible closure of one of DOE's remaining gaseous diffusion plants (GDP).

Prior to this inter-government agreement, another agreement involving Russian HEU was announced. On July 22, Allied-Signal Inc. and Nuclear Fuel Services Inc. (NFS), both of the USA, announced that they had signed a protocol with the Russian Ministry of Atomic Energy (Minatom) and the Russian Academy of Sciences to convert HEU from dismantled weapons into LEU. Initially, this program is projected to be on a small scale in the USA, but ultimately, the HEU is scheduled for conversion and blending at a commercial-scale plant planned for construction in Russia. The NFS plant in Erwin, Tennessee, is licensed to process HEU and has a small-capacity production line to convert metallic uranium into usable uranium compounds. This preliminary agreement by Allied and NFS also may fit into the plans envisioned in the inter-government agreement.

ANALYSIS & COMMENTARY

FEASIBILITY

While there are many obstacles to the implementation of the US-Russian HEU conversion agreement, including non-proliferation concerns, environmental regulations, and transportation issues, the most obvious step that must occur to achieve success is the physical transformation of HEU to LEU; HEU is defined as uranium enriched to 20.0 weight-percent ($\%$) ^{235}U , or greater. Weapons-grade HEU typically is enriched to 93-94 $\%$ ^{235}U ; this high level of enrichment, plus special mechanisms and geometry, are necessary to produce an explosive chain reaction. LEU is enriched to less than 20.0 $\%$ ^{235}U , and most light water reactors typically use 2.0 $\%$ to 5.0 $\%$ material.

Enrichment Blending

The first and foremost challenge (assuming that the implementation contract is promptly concluded, signed, and approved by each government), is the need to convert the HEU metal to UF_6 or UO_2 and then blend it into LEU. Very limited capacity for converting HEU to LEU exists, and governments generally limit or prohibit intermingling of commercial-use uranium and weapons-use material, and keep the respective industries separate as well.

Uranium blending is the process that can make HEU usable in commercial reactors, and the basics of enrichment blending are the same, regardless if the initial material has an enrichment of 4.0 $\%$ ^{235}U or 94.0 $\%$ ^{235}U . In theory, enrichment blending is simply the combining of two batches of enriched uranium, each having different assays, to achieve the desired average product enrichment. For instance, as shown in **Example 1**, blending 10 MTU of 3.4 $\%$ ^{235}U with 10 MTU of 3.6 $\%$ ^{235}U will yield 20 MTU of 3.5 $\%$ ^{235}U product. There is no loss of feed material, as the equivalent natural uranium contained in the blended product is the sum of the natural uranium necessary to create the ingredients (no uranium atoms are lost). However, blending is conceptually the opposite of the enrichment (or separation) process, and some SWU are lost in the blending process.

While it would seem inefficient to waste SWU, the losses from blending LEU are usually small, and the cost may be insignificant compared to the benefits. In the example, SWU lost by blending represent only about 0.01 percent of the SWU contained in the input batches. Moreover, to say SWU are "lost" in the dilution process could be misleading. It is less efficient to enrich uranium to a high level and bring it back down to a low level, than to enrich it to the low level initially. The SWU "loss" is a measure of this inefficiency.

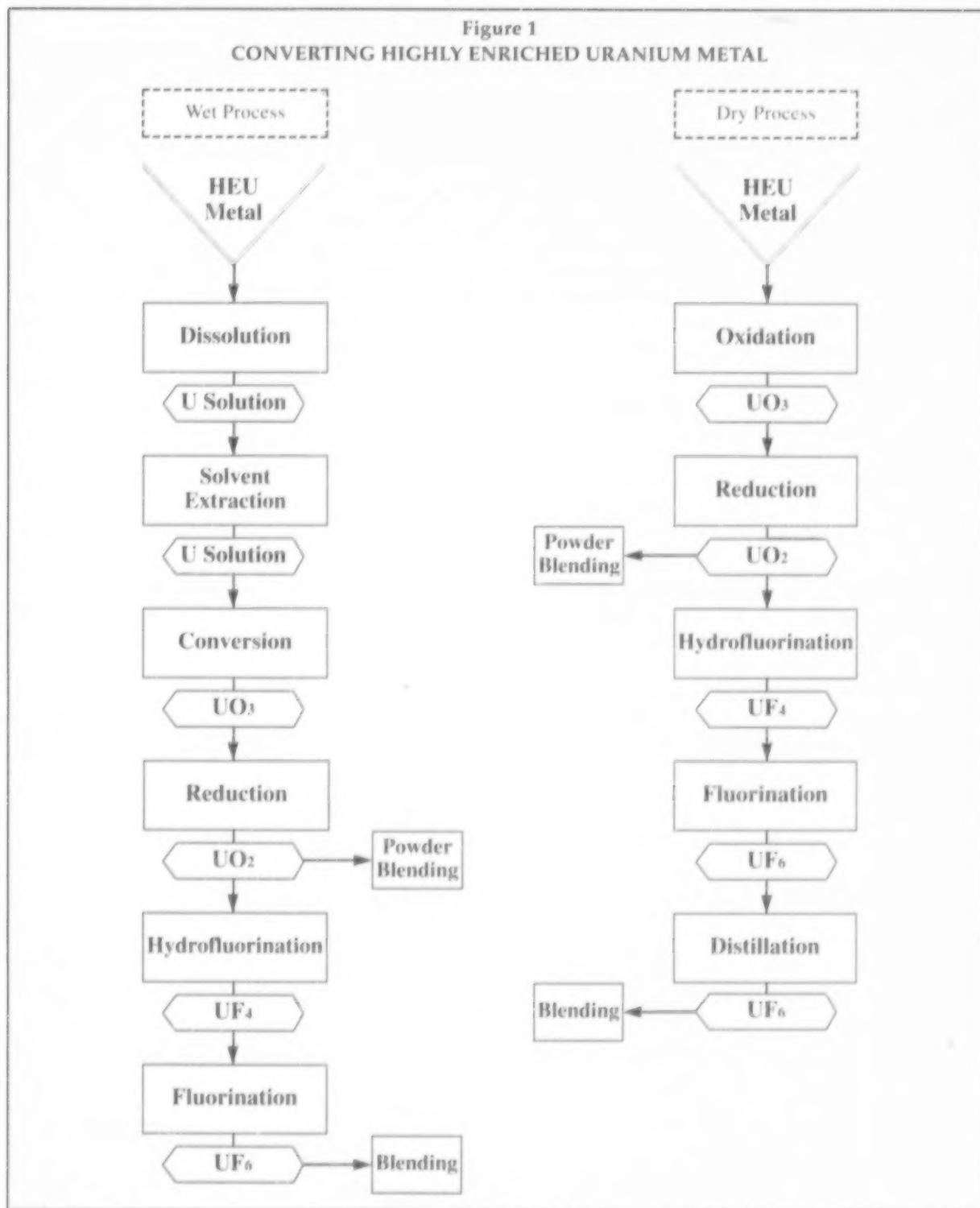
Example 1
BASIC LEU ENRICHMENT BLENDING

In Units of Enriched UF_6 (UF_6)				
Quantity A	+	Quantity B	=	Product
10,000 kgU [as UF_6] @ 3.40 $\%$	+	10,000 kgU [as UF_6] @ 3.60 $\%$	=	20,000 kgU [as UF_6] @ 3.50 $\%$
Equivalent to*		Equivalent to*		Equivalent to*
75,430 kgU feed 41,540 SWU		80,290 kgU feed 45,250 SWU		155,720 kgU feed 86,780 SWU
Net feed gain/loss = $(75,430 + 80,290) - 155,720 = 0$				
Net SWU gain/loss = $(41,540 + 45,250) - 86,780 = -10$				
Percentage SWU loss = $[10 \div (41,540 + 45,250)] \times 100\% = 0.01152\%$				

* @ 0.3 $\%$ ^{235}U tails assay

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Figure 1
CONVERTING HIGHLY ENRICHED URANIUM METAL



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Blending losses depend upon the difference between the ingredient enrichment levels. A small difference (e.g., 0.2 % ^{235}U when blending 3.4 % ^{235}U material with 3.6 % ^{235}U material) yields only a small SWU loss. The larger the difference between the two input materials, the higher the percentage loss. This is due to the logarithmic relationship governing the amount of additional SWU required to enrich uranium to the next incremental level. Thus, when blending down (diluting) HEU to LEU, SWU losses can be large; however, SWU losses from blending should be considered in terms of the relative cost of enriching material to the required design level. That is, although there will be some SWU "lost" during blending, the extra SWU contained in the higher level material can be considered a sunk cost, and therefore, blending may offer an economic means of generating LEU at the desired assay.

HEU Blending

Highly-enriched uranium is fabricated as U metal; to dilute HEU to a usable form of LEU, the HEU metal must first be converted to UF_6 or UO_2 using a wet or dry process (Figure 1). Assuming UF_6 is the desired product,

the dry process involves oxidation and reduction to UO_2 , and then fluorination. This is the technology Allied plans to provide to Russia in its joint venture with NFS. The wet process involves dissolution, solvent extraction, conversion, and reduction to UO_2 , followed by hydrofluorination and fluorination, to produce UF_6 .

After converting from U metal, the resultant highly enriched UF_6 or UO_2 then must be blended down to usable LEU. The dilutants can be natural uranium, depleted uranium tails, reprocessed uranium, or other LEU in the form of UF_6 or UO_2 . Once blended, the LEU can be introduced into the fuel fabrication process.

Example 2 presents the basic calculations used when blending HEU. The HEU is assumed to have a 94.0 % ^{235}U enrichment level, and natural uranium is assumed as the dilutant. For the sake of simplicity in this discussion, process losses are considered to be zero. In reality, however, process losses do occur when converting U metal to UF_6 or UO_2 , and also during the blending process. The feed and SWU losses that would be created when blending the HEU purchased from Russia are shown

Example 2 HEU BLENDING WITH NATURAL URANIUM

In Units of Enriched UF_6 (UF_6 e)

HEU	+	Dilutant	=	Product
1.0 kg [HEU]	+	n kg of dilutant	=	(1+n) kg of product
1.0 kg @ 94.0 % [HEU]	+	n kg @ 0.711 % [Natural U]	=	(1+n) kg @ 4.0 % [LEU]
(1.0 kg $\times$ 0.94)	+	(n $\times$ 0.00711)	=	(1+n) $\times$ 0.04
		0.94 + 0.00711 n	=	0.04 + 0.04 n
		(0.94 - 0.00711 n)	=	0.94 - 0.04
		n	=	0.90 + 0.03289
		n	=	27.3639 kg [natural U dilutant]
		n + 1	=	28.3639 kg @ 4.0 % [LEU]

That is, blending one kilogram of 94.0 % HEU with 27.3639 kilograms of natural uranium yields 28.3639 kilograms of 4.0 % LEU. From this relationship, the natural uranium dilutant required and the product yielded from any amount of 94.0 % HEU can be determined. In the recent agreement, ten metric tons of HEU (10,000 kg) will be converted annually for the first five years.

Thus,

$$10,000 \text{ kg @ } 94.0 \% \text{ [HEU]} + 273,639 \text{ kg [natural U]} = 283,639 \text{ kg @ } 4.0 \% \text{ [LEU]}$$

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in **Examples 3** and **4**. While there are no theoretical feed losses, the SWU lost are significant, totalling more than 500 thousand SWU for each 10 metric tons of 94.0% HEU.

Adequate Capacity

Since there are no commercial-scale facilities in the USA to convert HEU metal, the availability of conversion and blending capacity is the most obvious hurdle to be overcome. Whether a plant is built in the USA or Russia, new capacity must be constructed for transforming metallic HEU and blending the resultant highly enriched UF_6 or UO_2 . The needed technology is already proven, so no additional research and development is necessary to develop process specifications. However, several technical problems must be considered in converting HEU, such as de-coating and chopping of metallic uranium prior to treatment. Since metallic uranium is flammable, this operation may have to be performed in an inert gas environment.

Two US facilities—one owned by NFS, and the other by Babcock & Wilcox Naval Division—are licensed to

process HEU, and the NFS plant can convert metallic uranium to usable uranium compounds in small quantities. DOE also has a small-capacity reprocessing plant at its Idaho National Engineering Laboratories that processes spent HEU fuel from nuclear submarines, but it is not suited for this type of HEU conversion and blending. The NFS plant would require substantial modification to be able to convert and dilute HEU metal to usable LEU on a commercial-scale, and probably would need to have its license amended accordingly.

Capital costs of a large-capacity HEU metal conversion plant (250 MT of HEU annually) have been estimated to exceed US\$300 million, and for a similar-sized dilution facility, US\$150 million. For smaller facilities that would more closely match the projected 30 MT-per-year import level, the costs would be approximately one-third as much. In any case, five years may be required for construction, and perhaps much longer, depending on the rate of approval of environmental impact statements, licensing, and other regulatory requirements.

Example 3 FEED LOSSES DURING THE HEU BLENDING PROCESS

From standard enrichment tables for 4.0% ^{235}U product assay, and 0.30% tails assay, 283,639 kg of 4.0% material would contain:

2,553,318 kgU of equivalent natural U feed, and
1,496,479 SWU

For comparison, the feed content of 10 metric tons of 94.0% HEU is:

2,279,810 kgU as UF_6 .

As shown in the result in *Example 2*, to produce 283,639 kg of 4.0% LEU from 10 MT of 94.0% HEU requires:

273,639 kgU of natural uranium dilutant.

Thus, the total feed content is:

2,279,810 kgU to enrich to HEU
+ 273,639 kgU to dilute to LEU
2,553,449 kgU to enrich and then dilute

As can be seen by comparing the two total feed requirement results, there is no theoretical loss of feed during the blending process. (The differences shown here are attributable to rounding errors introduced during the calculations.)

- 2,553,449 kgU to enrich to HEU, then dilute to LEU
- 2,553,318 kgU to enrich directly to LEU

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Example 4 SWU LOSSES DURING THE HEU BLENDING PROCESS

From standard enrichment tables for 4.0% ²³⁵U product assay, and 0.30% tails assay, 283,639 kg of 4.0% material would contain:

2,553,318 kgU of equivalent natural U feed, and
1,496,479 SWU

For comparison, the SWU required to produce 10 metric tons of 94.0% HEU is:

2,023,840 SWU

Therefore, blending down 10 metric tons of 94.0% HEU to 4.0% LEU, leads to a loss of 527,361 SWU.

2,023,840 SWU contained in 94.0% HEU

– 1,496,479 SWU contained in 4.0% LEU

527,361 SWU "lost" in the dilution process

"Value" of the lost SWU at current spot prices:

527,361 SWU lost × \$66.00 per SWU = \$34,805,826

283,639 kgU of 4.0% LEU × \$567 per kg = \$160,823,310 (total value of LEU)

[\$34,805,826 ÷ \$160,823,310] × 100% = 21.6% (percent of total value of LEU)

However, this "lost" SWU from the HEU can arguably be considered to have zero value, since the SWU is neither recoverable nor marketable.

Transportation

Transportation of the HEU could be another obstacle. Presently, the US Nuclear Regulatory Commission (NRC) limits the safe, secure transport of HEU to five kilograms per shipment. However, the NRC is reviewing this policy, and changes to the regulations to allow greater transport quantities and/or more frequent deliveries could be implemented relatively easily. Furthermore, while the USA transports much of its weapons-grade material by air, Russia primarily uses its railways for transport. Therefore the time required to dismantle warheads in Russia could be prolonged, since each warhead must be disarmed, crated in a special container, and moved by rail to one of twenty preliminary storage sites in the Ural mountains. The HEU would be extracted, and further transported to another site for storage. Although this extensive transport is not prohibitive, it could delay the rate at which the HEU becomes available to DOE.

Safeguards

International Atomic Energy Agency (IAEA) safeguards regulate all LEU material and facilities, and the agency's Department of Safeguards is the primary organization responsible for preventing the proliferation of nuclear weapons. Through its regular monitoring of facility inspections, material accounting, and information collection and analysis, the IAEA tracks all nuclear material and equipment to ensure its non-military use. The IAEA inevitably will become involved in the HEU blending process, because uranium enriched (or blended down) to less than 20.0% ²³⁵U is subject to safeguards, and must be disclosed by countries that have agreed to abide by IAEA guidelines. Proposals from both governments on how to implement the US-Russian agreement have supported active IAEA participation to ensure safeguarded storage and processing of the resultant LEU.

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Interim Storage

Another important issue is safe and secure interim storage of the HEU prior to its conversion and dilution. The present agreement envisions at least a 20-year program before the present HEU quantities are processed. Thus, a maximum-security facility, subject to both national and international safeguards, must be established. The challenges of implementing mutual inspections and controlling national security probably will be discussed as part of the upcoming negotiations on the implementing contract.

Licensing

Any existing facility in the USA being modified to process HEU on a commercial scale likely will require a new or amended operating license. This could present further delays in converting the Russian HEU into usable nuclear fuel.

Environmental Concerns

Environmental issues will affect virtually every stage of the conversion and blending processes. Transportation of HEU already has been raised as an issue of environmental concern, particularly regarding potential accidents. Any significant expansion of metallic uranium conversion facilities in the USA probably will require a full environmental impact statement, which could take one or two years for complete review and approval. Also, since process losses and wastes are a manufacturing reality when converting and blending HEU, disposition of these wastes becomes another issue to be solved. Most of the environmental concerns are essentially the same as those existing for long-term storage or disposal of nuclear waste, including spent fuel and other by-products. Once the USA and other countries resolve their waste disposal problems, most of the primary environmental concerns regarding the dilution of HEU will have been addressed.

MARKET IMPLICATIONS

How and when uranium from dismantled weapons would affect the market is the major question many industry participants are asking. To give perspective to the situation, here are some of the factors affecting that question.

- At least 500 metric tons of HEU from Russia could be made available over the next 20 years—five years at 10 MTU per year, and 15 years at 30 MTU per year.
- As shown in Example 2, if 10 metric tons of 94.0% HEU were converted and blended to 4.0% LEU, it would yield 284 metric tons of LEU.

- Projected world and US average annual natural uranium requirements for the period 1994 through 2000 are:

Forecast annual world requirements = 162 million lbs U₃O₈

Forecast annual US requirements = 45 million lbs U₃O₈

- If all the requirements were 4.0% LEU, they would equal:

Forecast annual world requirements = 6,887 MT 4.0% LEU

Forecast annual US requirements = 1,913 MT 4.0% LEU

Therefore, for the first five years the HEU is converted and made available as commercial nuclear fuel, it could fill four percent of world requirements, or more than 14 percent of US requirements. If the HEU quantity being sold by Russia reaches the targeted 30 metric tons per year, it could eventually supply as much as 12 percent of world requirements or 44 percent of US requirements. Assuming DOE's annual production is 11 million SWU, this higher level of HEU would displace approximately 40 percent of its production, and bring DOE's total production down to roughly 6.5 million SWU—low enough to close a GDP.

At current spot market prices, the value of UF₆ at 4.0% ²³⁵U is \$567 per kilogram. With the NUEXCO SWU Value for enrichment services equalling \$66 per SWU, the SWU lost during HEU dilution theoretically could account for more than 21 percent of the value of the LEU material. However, assigning a value to the SWU "lost"

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during the HEU blending process is debatable, since there is no commercial market for HEU. Only the SWU contained in the LEU have any commercial value; therefore any SWU contained in HEU in excess of what is marketable as LEU, is not recoverable and effectively has no value. Thus, the value of HEU is tied to its value when converted and used as LEU, and should be evaluated accordingly.

The cost of LEU produced from HEU has two primary components: the costs incurred while converting and blending the HEU metal (including dilutant); and the purchase price for the HEU. The operational costs of blending are unavoidable and will be incurred relative to the quantity of HEU blended. Therefore, the price paid for the HEU can significantly affect the economics of the process.

However, the cost of originally producing the HEU can be considered a sunk cost. In order to have favorable economics, the incremental cost of producing LEU via dilution must be less than DOE's incremental cost of producing LEU directly from natural uranium. Further, DOE can realize significant cost savings in three ways. First, by feeding the LEU into its customer contracts, DOE can reduce its production costs at its enrichment plants by lowering its production levels, thus avoiding higher-priced, fixed-power electricity contracts. These savings could become particularly meaningful after 1995, when regulatory requirements dictated by the Clean Air Act will significantly increase electricity costs at DOE's dated gaseous diffusion plants.

Secondly, since DOE already has uncommitted capacity at its enrichment plants, it also could shut down one of its GDPs, resulting in further cost savings. Additionally, since its customers will continue to deliver the full amount of uranium feed dictated by their enrichment services contract, DOE could derive more savings by continuing or expanding its present overfeeding program, thereby lowering its production costs further and making it more competitive.

Having an even greater effect will be the timing of when the material reaches the market through DOE. Optimistically, an implementing contract could be signed in 1993, thereby permitting HEU to be delivered as early as 1994 (assuming sufficient quantities can be physically recovered from dismantled weapons by that time, and that the material can be safely and securely transported). Given the present level of conversion and blending capacity, the first small quantities of LEU could, theoretically, be ready by late 1995. However, delays can reasonably be expected due to licensing, transportation, and conversion issues, and at the earliest, material could be ready for DOE customers in 1996 or 1997. Further, if new facilities are constructed and full environmental impact statements and new license approvals are required, it may be five or more years before conversion of significant quantities could even begin. Therefore, realistically, it will be at least the latter part of this decade before the first significant quantities reach the market.

CONCLUSION

The dismantlement of nuclear weapons and the conversion and use of the HEU for peaceful purposes are major steps forward for the world. HEU can be blended down into usable fuel for commercial nuclear reactors; while some losses occur in the process, it can be economically viable. However, whether or not the economics of the process are attractive, the program is likely to proceed because of its enormous socio-political significance and weapons-reduction implications. It is up to US and Russian negotiators to determine what HEU price level will provide an appropriate economic incentive to DOE and still bring an acceptable economic benefit to Russia. Several obstacles may slow the progress of this landmark US-Russian agreement, including inadequate conversion capacity, transportation issues, safeguards requirements, licensing approvals, and environmental concerns, but all of these can be overcome.

FOCUS

TAIWAN'S NUCLEAR PROGRAM

BACKGROUND

The Republic of China, more commonly known as Taiwan, is one of the newly industrialized countries of Asia and has been called one of its four "economic tigers" (along with South Korea, Hong Kong, and Singapore). The island nation of Taiwan is located approximately 100 miles off the southeast coast of mainland China, between Japan and the Philippines, and covers 13,970 square miles (slightly smaller than Switzerland). It has a population exceeding 20 million people, with almost five million living in the capital of Taipei, making Taiwan the second most densely populated country in the world. Taiwan has one of the world's most rapidly growing economies; major industries include electronics, textiles, food processing, chemicals, and plastics. Annual growth of Taiwan's gross national product (GNP) has averaged more than seven percent for the past four years and the country is now the twelfth largest trading nation in the world, with a GNP exceeding US\$150 billion.

Taiwan presently relies on nuclear power to supply more than one-third of its electricity requirements. The country operates six reactors at three stations with a total net capacity of 4,842 MWe (**Figure 1**), and the government recently approved plans for construction of a fourth nuclear power station.



Figure 1 — Chinshan Nuclear Power Station. Taiwan's first nuclear station contains twin 604-MWe BWRs. (Photo courtesy of Taipower)

ENERGY SITUATION

With Taiwan's rapid industrialization comes a growing demand for energy. Since the country has limited natural resources, it must import most of its energy supplies. Imported oil and natural gas contribute more than half the country's total energy supply; coal, both imported and domestic, contributes about 26 percent. Nuclear power provides 14 percent of the total energy supply, and hydroelectric power, the remaining eight percent.

Electricity Supply

The state-owned utility, Taiwan Power Company (Taipower), is striving to keep up with rapid growth in electricity demand. Peak load demand has grown at the astounding rate of more than ten percent annually almost every year since the mid-1980s. Taipower was able to maintain a reserve margin exceeding 40 percent until a few years ago, but that figure has now dropped to less than ten percent. Taipower's total generating capacity presently equals 17.12GW, and peak demand near the end of July 1992 reached 16.45 GW. Blackouts and brownouts occurred during 1991, and capacity reserve reached a record low of only 4.8 percent. Taipower is concerned that with such small reserves, shortages could recur if any two major generating stations experience outages simultaneously.

To meet the growing power demand, Taipower plans to add 19 thousand MWe of capacity in the upcoming decade. The company currently is in the midst of an aggressive power plant construction program to meet immediate demand. It has moved up scheduled completion dates of oil-, natural gas-, and coal-fired plants under construction and in the planning stage. Within the last two years, Taipower has started up a 327-MWe oil-fired plant at Taichung, and a combined-cycle (oil/gas) plant at Tungkiao. The utility plans to continue to rely on fossil-fuels, particularly liquid natural gas (LNG), for most of its new generating capacity. Of the country's planned new capacity additions, only 10-15 percent will be new nuclear capacity, primarily because Taipower wishes to

maintain a diversified capacity base and because the country's well-organized anti-nuclear opposition makes siting new nuclear plants difficult. Nevertheless, due to the increased power demand, the importance of nuclear energy has become more evident than ever, and the need for the country's seventh and eighth reactors at a fourth station has become great enough to overcome political opposition.

NUCLEAR POWER PROGRAM

Operating Stations

Taipower currently operates six nuclear power units—four boiling water reactors and two pressurized water reactors—located at three stations, with a total net capacity of 4,842 MWe (**Table 1**). Kuosheng and Chinshan stations in northern Taiwan each contain two BWR units (**Figure 2**), and the Maanshan station on the southern tip of the country

contains two PWRs. The country's nuclear stations generated 33,496 GWh in 1991, with an average capacity factor of 79 percent. The power generated by the six reactors contributed 37.8 percent of Taiwan's total electricity in 1991. Nuclear generating capacity accounts for approximately 30 percent of total capacity, a ratio that Taipower wishes to maintain as its overall generation capacity expands.

Taipower conducted feasibility studies for the country's first nuclear plants in 1967 and 1968. Construction began on the nation's first station in June 1972; the twin 604-MWe BWRs at Chinshan were supplied by General Electric and utilized GE's Mark I containment. Chinshan 1 and 2 began commercial operation in 1978 and 1979, respectively. Both reactors have operated fairly well and the plants' average annual capacity factors have often exceeded 70 percent, with Chinshan 1 achieving an 83 percent capacity factor in 1991.

Table 1
NUCLEAR POWER UNITS IN TAIWAN

Unit	Lead Utility or Fuel Buyer	Capacity (MWe net)	Type	COD ¹	Units In Operation	
					1991 Capacity Factor (percent)	Total 1991 Electricity Generation (GWh net)
Chinshan 1	Taipower ²	604	BWR	1978	83	4,403
Chinshan 2	Taipower	604	BWR	1979	72	3,797
Kuosheng 1	Taipower	918	BWR	1981	72	5,786
Kuosheng 2	Taipower	936	BWR	1983	87	7,120
Maanshan 1	Taipower	890	PWR	1984	81	6,341
Maanshan 2	Taipower	890	PWR	1985	78	6,048
TOTAL		4,842		(1991 Average: 79)		33,496
Unit	Lead Utility or Fuel Buyer	Capacity (est. MWe net)	Type	COD ¹	Units Planned	
Yenliao 1	Taipower	1,150	LWR ³	2000		
Yenliao 2	Taipower	1,150	LWR	2001		
TOTAL		2,300				

¹COD = Commercial Operation Date (actual or expected)

²Taipower = Taiwan Power Corporation

³LWR = Light Water Reactor

Figure 2
NUCLEAR POWER UNITS IN TAIWAN



Taiwan's second nuclear power station was built at Kuosheng (**Figure 3**). Both reactors once again were supplied by GE; the reactors featured Mark III containment. After beginning construction in November 1975, Unit 1 (a 918-MWe BWR) was declared in commercial operation in late 1981, and Unit 2 (a 936-MWe BWR) went commercial in March 1983. This station also has performed quite well, with a capacity factor averaging more than 78 percent the past two years.

Construction on the country's third station at Maanshan began in August 1978. The 890-MWe PWRs were supplied by Westinghouse and represented Taiwan's fifth and sixth reactors. Maanshan 1 began commercial operation in 1984 and Maanshan 2, in 1985 (**Figure 4**). While performance was lackluster the first few years, recent operation has been quite good, with capacity factors near 80 percent. Each unit produced approximately 6,000 GWh in 1991.

Planned Fourth Station

While Taiwan currently faces growing electricity demand and a low capacity reserve, ironically, slower-than-expected economic and electricity demand growth in 1981 and 1982, led the government to stop plans in June 1982 for construction of a fourth nuclear station at Yenliao. Taipower had already evaluated offers from several suppliers and was negotiating with Combustion Engineering Inc. for two 950-MWe PWRs when the plans were halted.

Increased demand for electricity and rapid economic growth resumed by the mid-1980s, but by that time, strong anti-nuclear opposition had begun to emerge, and public acceptance of nuclear power was quite low as a result of the Chernobyl accident in 1986. Thus, proposals to restart the

process of building the fourth station were repeatedly unsuccessful. In fact, in 1986, in the backlash of the Chernobyl accident, the Legislative Yuan froze pre-construction funds (US\$316 million) that were earmarked for the Yenliao station, thereby preventing any forward movement on the project.

Not until this past year have conditions been conducive to renew efforts to build the fourth station: the Executive Yuan (cabinet) supports nuclear power; demand for



Figure 3 — Kuosheng Nuclear Power Station. Taiwan's second nuclear power station, which began operation in 1981. (Photo courtesy of Taipower)

electricity remains very strong; energy shortages are imminent unless additional capacity is added; and the public relations effort exerted by Taipower over the past few years to increase public understanding and acceptance of nuclear power has had some success. As the need for the fourth station became undeniable and public acceptance increased, the proposal to resume plans for the country's seventh and eighth reactors gained the government support necessary to receive approval for the project. As a result, after receiving approvals from the Ministry of Economic Affairs (MOEA) and the Executive Yuan, the budget committee of the Legislative Yuan voted 5 to 3 on June 3, 1992, to release the pre-construction funds for the Yenliao station that had been frozen in 1986. An Environmental Impact Assessment Report on the station is being evaluated by Taiwan's Atomic Energy Council, and a comprehensive safety report is being prepared by the MOEA.

The proposed station will be built on the Yenliao peninsula, near the village of Kungliao, in northeastern Taiwan. The timeline in **Table 2**

shows the historical development of the project and its planned construction schedule. Taipower already has solicited offers to select the architect/engineer for the project, and bid invitations for the nuclear steam supply systems and the turbine generators are planned for release near the end of this year. Four primary bidders are expected for the nuclear island. They include Asea Brown Boveri/Combustion Engineering with its System 80+ PWR; General Electric with an advanced BWR (developed in conjunction with Hitachi and Toshiba); Westinghouse with an advanced PWR (with Mitsubishi); and Nuclear Power International, the joint-venture between Framatome

and Siemens, with a PWR. Offers will be due during the first half of 1993. The project will be bid for two 1,000-1,300 MWe (gross) units, with a possible option for two more units at the same site. **Figure 5** is an artist's depiction of the new station. Once all approvals have been received—for example, safety and environmental impact—construction is scheduled to begin in 1995, with commercial operation of Yenliao 1 planned for the year 2000 and Unit 2, one year later.



Figure 4 — Maanshan Nuclear Power Station Control Room. (Photo courtesy of Taipower)

TABLE 2
TIMELINE FOR TAIWAN'S FOURTH NUCLEAR STATION

June 1982	Dip in projected power demand leads the government to stop negotiations with Combustion Engineering on the country's fourth nuclear power station. All plans for the two-unit (950 MWe each) station are postponed.
Mid- to Late- 1980s	Authorities try several times to restart the project, but a growing anti-nuclear lobby and the backlash of public opinion as a result of the Chernobyl accident prevent its revival.
Nov. 1991	As part of its new, six-year national economic plan, the Taiwan government announces a NT\$300 billion plan for infrastructure improvements, and states that likely projects include the country's seventh and eighth nuclear units.
Jan. 1992	Feasibility study conducted by Commission on National Corporations (CNC) is released; it concludes that construction of the fourth nuclear power station should proceed. The CNC is the government agency beneath the Ministry of Economic Affairs that is directly responsible for supervising the state-owned utility, Taiwan Power Company (Taipower).
Feb.	Ministry of Economic Affairs (MOEA) endorses findings of the CNC and forwards the plans to the Executive Yuan (cabinet) for action. Executive Yuan quickly approves the plans for construction of the fourth station at Yenliao in which the country's seventh and eighth reactors would be located. Atomic Energy Council (AEC) accepts the Environmental Impact Assessment Report on the station from the MOEA. The AEC is expected to take at least six months to evaluate the report. The MOEA also begins the estimated year-long process of preparing a safety report on the station to submit to the AEC. Once submitted, the safety report is expected to take another year for review and approval.
May	Amid anti-nuclear protests from the minority, the Legislative Yuan votes to allow the budget committee to decide on the release of the frozen pre-construction funds.
June	Budget committee of Legislative Yuan votes to release US\$316 million in pre-construction funds for the station frozen since 1986.
July	Taipower issues bid invitations for project's architect-engineer company.
Dec	Taipower expected to issue bid invitations for the nuclear steam supply system (NSSS) and turbine generators.
1st Half 1993	Offers due for NSSS and turbine generators.
2nd Half	Contracts awarded for NSSS and turbines.
3rd Quarter 1995	Construction of Yenliao station begins.
3rd Quarter 2000	First unit scheduled to begin commercial operation.
3rd Quarter 2001	Second unit scheduled to begin commercial operation.

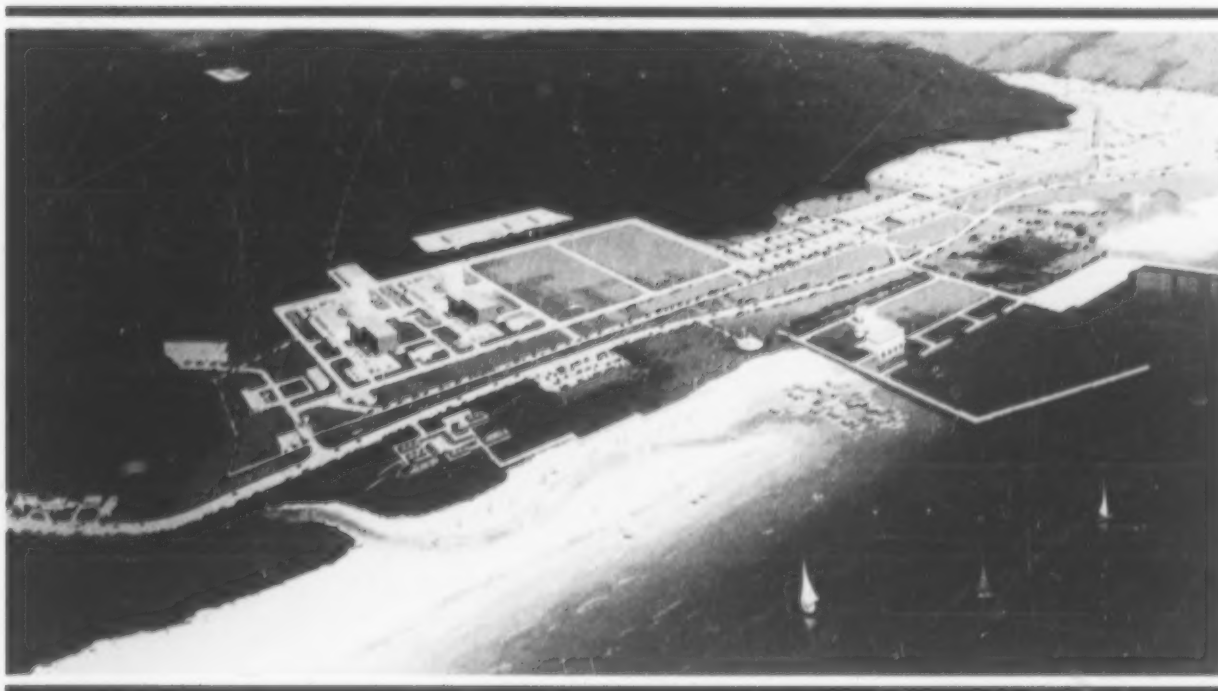


Figure 5 — Artist's Conception of Planned Yenliao Nuclear Power Station. (Photo courtesy of Taipower)

Future Plans

With Taiwan's low capacity reserve and an annual growth in electrical demand consistently near ten percent, clearly Taipower needs to add a significant amount of new generating capacity. Current plans call for total capacity to nearly double within the next ten years: 19 thousand megawatts of capacity will be added. Of this, approximately 15 thousand megawatts will be fossil-fueled capacity (primarily coal and LNG); two thousand will be hydroelectric capacity; and two thousand will be nuclear power (Yenliao station). Taipower would like to increase nuclear power's relative contribution to total installed generating capacity, although there is strong public opposition to significant nuclear expansion. In addition to the two new reactors at Yenliao, and a possible option to build two more units at that location, Taipower is considering adding additional units at the existing stations. This option was endorsed by Taiwan's Environmental Protection Administration as an alternative to locating new sites.

FUEL CYCLE

Facilities

Taiwan has not developed a complete fuel cycle industry to support its nuclear program and obtains nearly all of its required fuel and fuel cycle services from other countries. The country has no domestic uranium resources, so Taipower relies primarily on long-term supply contracts. The company has made an effort to enhance its security of supply position by participating in a uranium production joint-venture with Union Pacific Resources (UPR) of the USA, who owns properties in the Arizona Strip and in the Powder River Basin of Wyoming. UPR's uranium projects are all currently inactive, due to depressed market conditions.

Taiwan has, in the past, considered constructing a fuel fabrication facility, but still has not yet decided if and when to build. Given the addition of the country's seventh and eighth reactors, the economics of a domestic fabrication facility have improved. Taipower estimates that a decision regarding a fuel factory will not be made until after the

FOCUS

equipment required for the Yenliao station has been ordered, likely around 1995 or 1996. The fabrication plant would need to handle both BWR and PWR fuel, with one pellet line and separate fuel rod and bundle assembly lines.

Taiwan's only fuel-cycle facility is a low-level radioactive waste disposal site (**Figure 6**) located on Lan-Yu Island, about 50 miles east of the southern tip of Taiwan. This facility, which is operated by Taipower, began service in the early 1980s and is expected to reach capacity in roughly eight years. Thus, Taiwan is looking at potential locations for new facilities. One possibility has received considerable attention from the press: this proposal has Taiwan and mainland China cooperating on building a new medium- and low-level waste facility on an island off the southeast coast of the mainland. Mainland China would provide the land required and Taiwan would build and fund the facility, with both countries having access to the disposal site. Both sides have emphasized, however, that discussions of this topic are still unofficial and only in preliminary stages. If the proposal moves forward, it will mark a milestone in the relations of the two governments, as well as their first cooperation in the nuclear field.

Contracting

Due to the lack of fuel cycle facilities, Taipower has, by necessity, purchased most of its fuel cycle needs abroad. Taipower buys most of its uranium under long-term contracts, primarily from Cogema of France and Rössing Uranium, Ltd. of Namibia, although it does follow the spot market and makes occasional purchases, if economically justified. The company cannot buy uranium from Canada or Australia, as Taiwan does not have bilateral safeguards with those countries, primarily due to the political recognition differences brought about by the existence of both Taiwan and mainland China.

For its conversion needs, Taipower purchases UF₆ from Cogema and has long-term contracts with US converters. The utility fills most of its enrichment requirements

through long-term contracts with the US Department of Energy (DOE), with the balance supplied by Eurodif, Siemens Nuclear Power Corporation, General Electric, and Westinghouse provide all of Taipower's required fabrication services. The utility's reactors currently are operating under 18-month cycles, with one-third of the core typically replaced during each reload.

Nuclear industry participants have been heartened by the possibility of a new facility in Taiwan. If the proposed station overcomes all of its political hurdles and reaches commercial operation by the turn of the century, it will provide new marketing opportunities for the world's fuel cycle companies. The planned 2,000-MWe station would consume millions of pounds of equivalent UO₂ (as well as related conversion, enrichment, and fabrication services) over its lifetime, with the first orders coming as early as 1995 or 1996.

CONCLUSION

Taiwan is expected to continue its rapid economic growth. With this growth comes increasing demand for electric power, and the government of Taiwan has recognized that nuclear power must play an important role in sustaining the country's economic expansion. Taipower is dedicated to

providing the electricity needed by the country and plans to double installed generating capacity over the next decade, with new nuclear power capacity totalling at least 2,000 MW. While nuclear accounts for only ten percent of the planned capacity additions, as Taipower seeks to balance its supply sources and counter public opposition, it intends to maintain nuclear generating capacity at approximately 30 percent of total capacity. Taiwan will continue to support the nuclear expansion plans required to meet electricity demand, despite the well-organized opposition active in the country. 



Figure 6 — Low-level waste disposal site on Lan-Yu Island. (Photo courtesy of Taipower)

NUCLEAR INDUSTRY CALENDAR

1992

- Sept. 29-Oct. 1** *Crisis/Emergency Information Planners' Workshop* (Loews L'Enfant Plaza, Washington DC)
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Oct. 2-4** *IAEA/NEA International Seminar on Decommissioning Policies* (Paris, France).
Sponsored by the International Atomic Energy Agency and the OECD Nuclear Energy Agency.
Contact: IAEA Conference Service Section, P. O. Box 100, A-1400 Vienna, Austria.
- Oct. 11-16** *USCEA Training Seminar on the Fundamentals of Nuclear Power*
(Georgetown University Conference Center, Washington, DC).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Oct. 18-22** *AMC Mining Convention* (Las Vegas, Nevada).
Sponsored by the American Mining Congress.
Contact: AMC Convention Office; 202-861-2800; Fax: 202-861-7535.
- Oct. 19-23** *International Symposium on Geological Disposal of Spent Fuel, High-level and Alpha-bearing Wastes*
(Antwerp, Belgium).
Sponsored by the International Atomic Energy Agency.
Contact: IAEA Conference Service Section, P. O. Box 100, A-1400 Vienna, Austria.
- Nov. 9-10** *Financial Times/Power in Europe World Electricity Conference* (Hotel Inter-Continental, London, UK).
Contact: FT Conferences; 071-925-2323; Fax: 071-925-2125;
Mail: 126 Jermyn Street, London SW1Y 4UJ, United Kingdom.
- Nov. 15-18** *International Nuclear Energy Forum "A Shrinking World, Expanding Horizons"*
(Fairmont Hotel, Chicago, Illinois).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Nov. 15-20** *American Nuclear Society Winter Meeting* (McCormick Center Hotel, Chicago, Illinois).
Contact: ANS Meetings Department; 708-352-6611.
- Nov. 22-24** *2nd International Conference on CANDU Maintenance* (Holiday Inn On King, Toronto, Canada).
Sponsored by the Canadian Nuclear Association and Canadian Nuclear Society.
Contact: CANDU Conference; 416-823-9040; Fax: 416-823-6120;
Mail: 2251 Speakman Drive, Mississauga, Ontario, Canada L5K 1B2.

CALENDAR

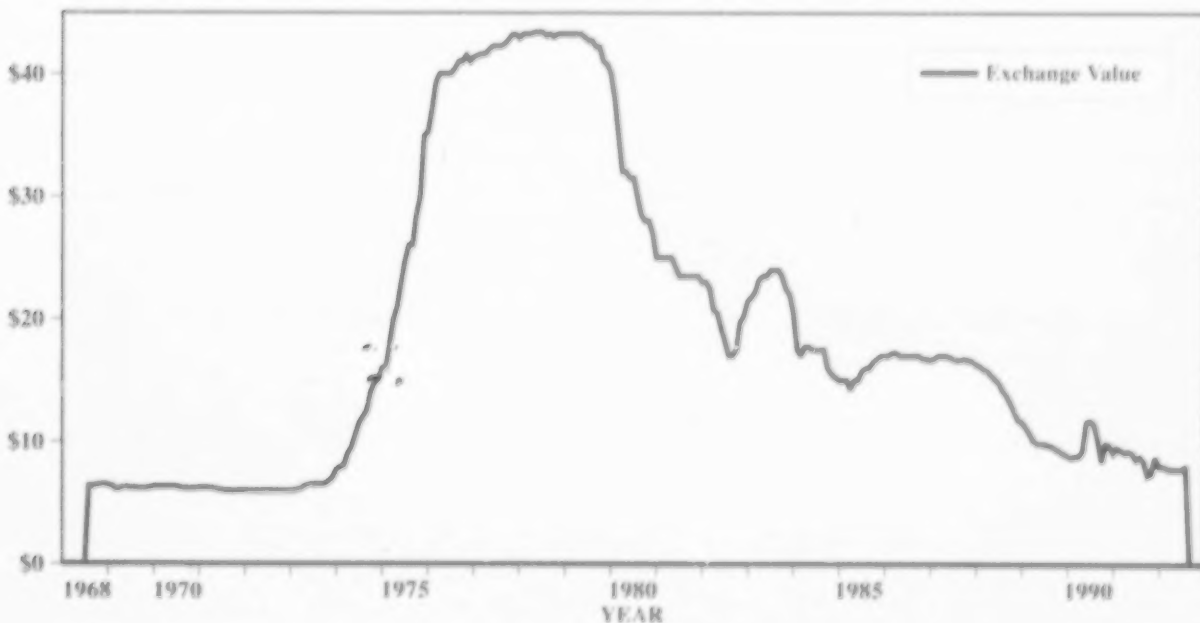
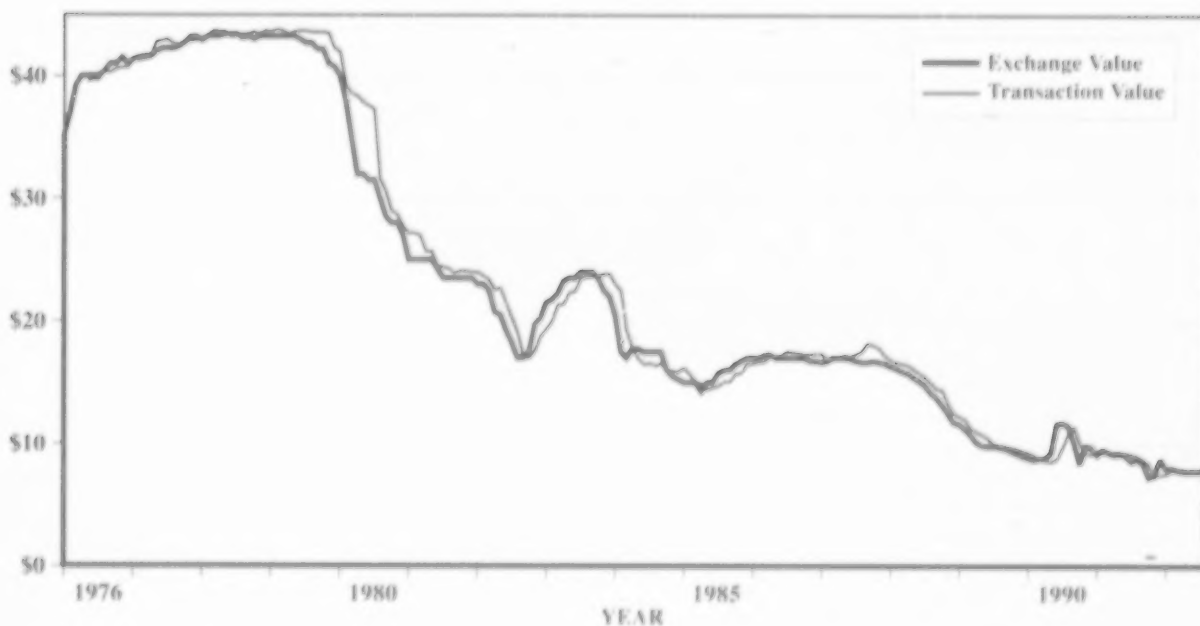
NUCLEAR INDUSTRY CALENDAR

1993

- Feb. 28-
Mar. 3** *Nuclear Insurance Conference* (Le Meridien at Coronado, San Diego, California).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Mar. 21-24** *Fuel Cycle Conference '93* (Lowes Anatole Hotel, Dallas, Texas).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- May 16-18** *INFO '93 Conference* (Don Cesar Hotel, Tampa, Florida).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Sept. 28-30** *Crisis/Emergency Information Planner's Workshop* (Westin William Penn Hotel, Pittsburg, Penn.).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Oct. 3-6** *Uranium Seminar '93* (Westin La Paloma Hotel, Tucson, Arizona).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.
- Oct. 3-7** *INC93 (International Nuclear Congress and Exhibition) "Towards a Better Future"*
(Sheraton Centre, Toronto, Canada).
Sponsored by the Canadian Nuclear Association and Canadian Nuclear Society.
Contact: INC93 Conference; 416-823-9040; Fax: 416-823-6120;
Mail: 2251 Speakman Drive, Mississauga, Ontario, Canada L5K 1B2.
- Nov. 14-17** *Nuclear Energy Forum* (Westin St. Francis Hotel, San Francisco, California).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113;
Mail: 1776 "I" Street NW, Suite 400, Washington, DC 20006-3708.

HISTORICAL MARKET DATA

NUEXCO HISTORICAL EXCHANGE VALUE AND TRANSACTION VALUE (in US dollars per pound U₃O₈)



HISTORICAL MARKET VALUES

Exchange Values

Year	Determined as of the last day of the month indicated (\$US/lb U ₃ O ₈)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	15.75	15.40	15.10	14.75	14.15	13.75	13.15	12.50	11.75
1989	11.60	11.20	10.70	10.10	9.85	9.80	9.80	9.70	9.60	9.40	9.20	9.00
1990	8.85	8.70	8.80	8.80	9.25	11.60	11.70	11.45	10.10	8.35	9.80	9.70
1991	9.10	9.50	9.30	9.10	9.20	9.05	8.55	8.75	8.40	7.25	7.40	8.75
1992	8.00	8.00	7.85	7.75	7.75	7.75	7.75	8.05				

US Premium (Relative to the Exchange Value)

Year	Determined as of the last day of the month indicated (\$US/lb U ₃ O ₈)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	0.25	0.60	0.00	0.00	0.00	0.00	0.00	Discontinued	

HISTORICAL MARKET DATA
UF₆ Values

Year	Determined as of the last day of the month indicated (\$US/kg U as UF ₆)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	45.25	44.75	44.00	42.75	41.00	40.75	39.00	37.50	35.50
1989	34.75	34.00	33.00	30.50	30.25	30.25	30.00	29.75	29.75	28.25	27.75	26.50
1990	25.90	25.25	24.40	24.40	25.50	32.00	32.50	32.25	29.50	24.75	28.75	28.75
1991	27.50	27.75	27.50	27.25	27.60	27.25	25.75	26.25	25.50	22.75	22.75	26.00
1992	24.50	24.25	24.00	23.75	23.60	23.60	23.50	24.25				

US Premium (Relative to the UF₆ Value)

Year	Determined as of the last day of the month indicated (\$US/kg U as UF ₆)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	0.50	1.00	0.00	0.00	0.00	0.00	0.00	Discontinued	

Conversion Values

Year	Determined as of the last day of the month indicated (\$US/lb U as UF ₆)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	1.80	1.80	1.80	1.85	1.95	1.95	1.95	1.95	1.95
1989	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.80	1.75	1.65
1990	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
1991	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.55	1.55	1.55	1.55
1992	1.60	1.60	1.60	1.60	1.60	1.50	1.50	1.50				

HISTORICAL MARKET DATA

Transaction Values

Year	Determined as of the last day of the month indicated (\$US/lb U ₃ O ₈)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.15	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	16.45	16.10	15.80	15.45	15.00	14.50	14.40	13.30	12.50
1989	12.25	12.00	11.25	11.00	10.75	10.45	9.95	9.80	9.80	9.65	9.55	9.40
1990	9.25	9.05	8.75	8.65	8.55	8.80	9.75	10.80	11.40	10.10	9.30	9.15
1991	9.40	9.45	9.35	9.30	9.30	9.20	9.15	8.95	8.70	8.35	7.45	7.50
1992	7.55	7.80	7.95	7.90	7.85	7.80	7.75	7.85				

SWU Values

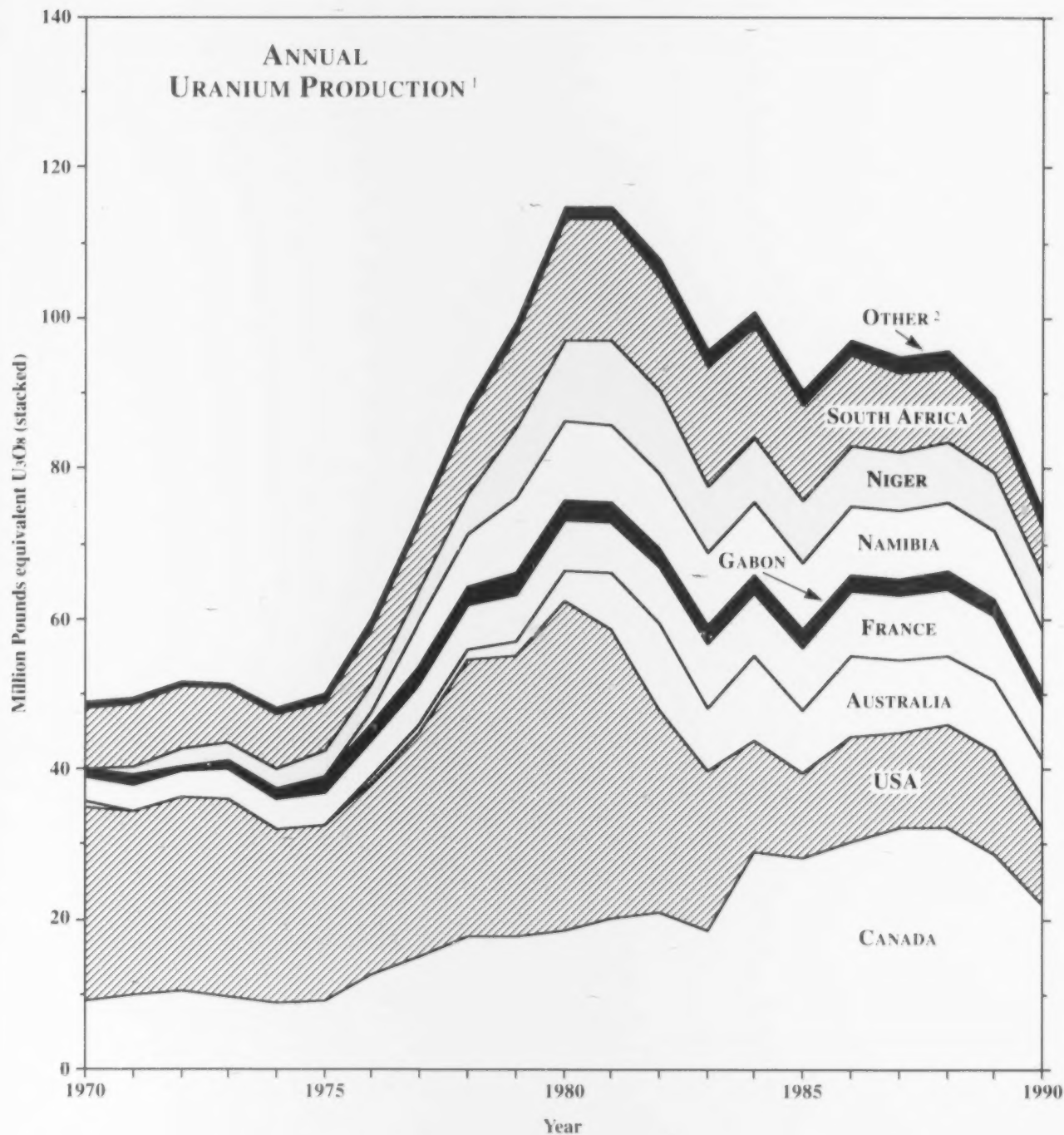
Year	Determined as of the last day of the month indicated (\$US per SWU)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	80	80	80	80	75	78	78	78	78	78	80	80
1987	80	80	77	77	75	73	75	75	73	69	73	73
1988	73	73	70	68	68	68	68	65	65	65	65	65
1989	65	67	67	67	66	66	66	65	63	59	57	54
1990	54	50	50	50	50	50	50	50	50	51	51	51
1991	51	50	52	52	54	59	66	67	67	68	68	70
1992	71	70	69	67	65	65	66	66				

HISTORICAL MARKET DATA
Loan Rates

Year	Determined as of the last day of the month indicated (Percent per Annum)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	4.00	4.00	4.00	4.00	4.00
1969	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00
1970	6.00	6.20	6.40	6.50	6.50	6.50	6.50	5.00	6.50	6.00	5.50	5.50
1971	5.00	4.75	4.75	4.75	5.00	5.25	5.25	5.25	5.25	5.25	4.50	4.50
1972	4.00	4.00	4.00	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00
1973	5.50	5.50	5.75	5.75	6.00	6.25	7.00	7.00	7.00	7.00	7.50	8.00
1974	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1975	8.00	7.00	7.00	7.00	7.00	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1976	6.50	6.50	6.50	6.50	*	*	*	*	*	*	*	*
1977	*	*	*	*	6.50	6.50	6.50	6.75	7.25	7.25	7.25	7.25
1978	7.25	7.00	7.00	7.00	7.00	7.50	7.75	7.75	7.75	7.00	7.00	7.00
1979	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1980	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1981	7.00	7.00	7.00	7.00	7.00	5.50	5.50	5.50	5.50	6.00	6.00	6.00
1982	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1983	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1984	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1985	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1986	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
1987	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	3.50	3.50
1988	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1989	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1990	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1991	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.00
1992	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00				

* Float with Prime Rate

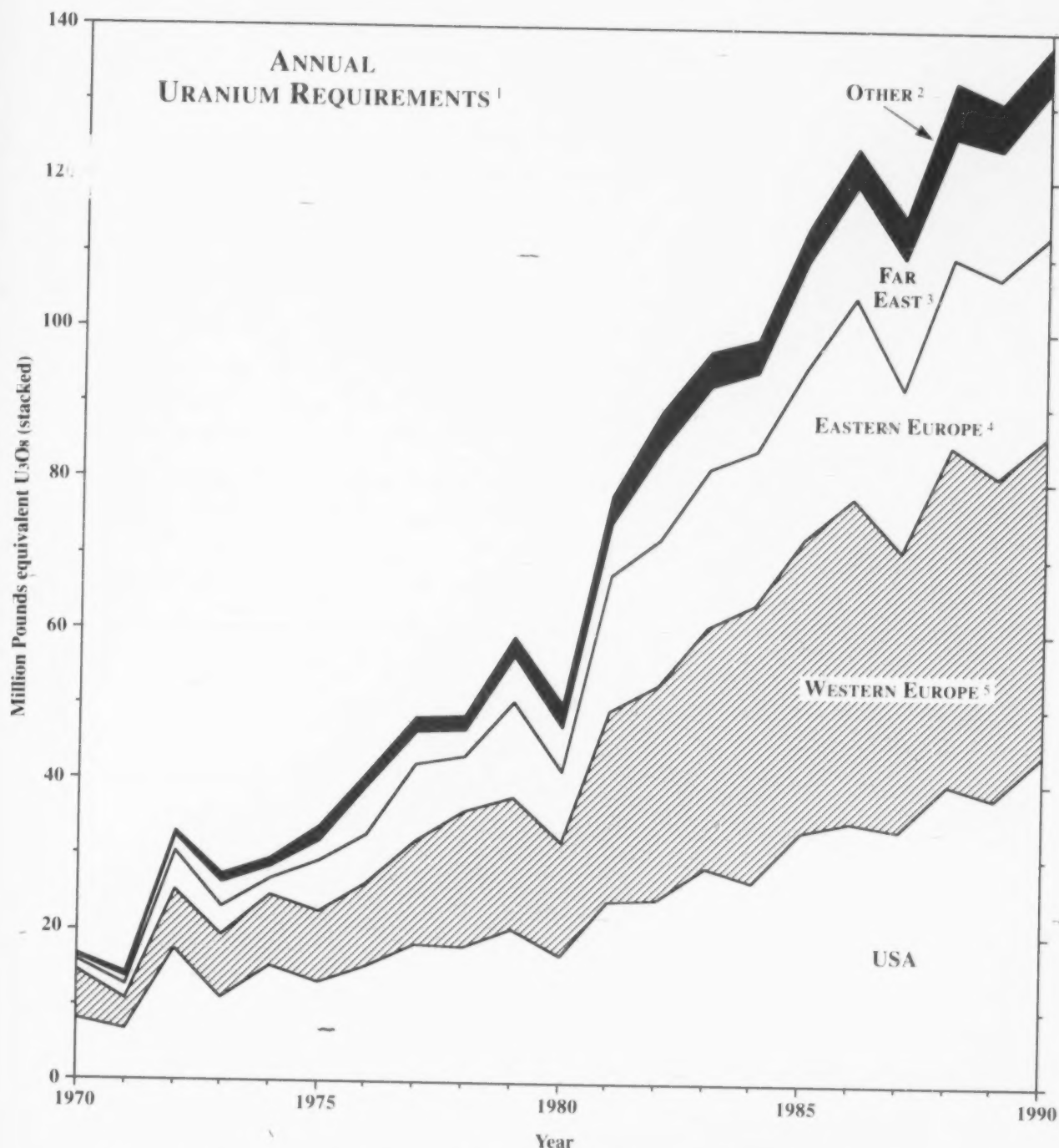
HISTORICAL MARKET DATA



¹ Estimated western world uranium production in 1990 totalled 74.5 million pounds equivalent U₃O₈ —
(Australia: 9.1 – Canada: 22.0 – France: 7.4 – Gabon: 1.8 – Namibia: 8.0 – Niger: 7.4 – South Africa: 6.4 – USA: 10.2 – Other²: 2.2)

² Other includes: Argentina, Belgium, Brazil, India, Pakistan, Portugal, Spain, former West Germany, and Yugoslavia (Slovenia)

HISTORICAL MARKET DATA



¹ Calculated by NUEXCO based on actual completion dates and operating performance, and NUEXCO's estimate of enriching tails assay.

² Other includes: Argentina, Brazil, Canada, India, Mexico, Pakistan, and South Africa.

³ Far East includes: Japan, People's Republic of China, South Korea, and Taiwan.

⁴ Eastern Europe includes: Bulgaria, Czechoslovakia, former East Germany, Finland, Hungary, former Soviet Union, and Yugoslavia (Slovenia).

⁵ Western Europe includes: Belgium, France, former West Germany, Italy, The Netherlands, Spain, Sweden, Switzerland, and UK.

GOVERNMENT STATISTICS

Australia

Year	Period	Consumer Price Index (1989/1990 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups (1984/1985 = 100)	Average Weekly Ordinary Time Earnings — Adult Males — Australia (Australian dollars)	Award Rates of Pay Indexes
					Australia - Adult Males In Mining Wage Earners, Weekly Rates (June 1985 = 100)
1980	Avg.	47.4	83.1	—	69.6
1981	Avg.	51.9	85.9	—	76.1
1982	Avg.	57.7	89.0	—	86.4
1983	Avg.	56.9	96.9	—	89.9
1984	Avg.	66.0	98.0	—	96.0
1985	Avg.	70.5	107.3	—	100.0
1986	Avg.	76.9	101.5	—	104.9
1987	Avg.	83.4	108.9	465.88	112.9
1988	Avg.	89.4	111.8	496.90	115.4
1989	Avg.	96.2	117.0	534.65	126.0
1990	Avg.	103.2	123.4	571.43	129.7
1991	Avg.	106.5	120.1	600.35	133.7
Jan	1991	—	125.6	—	133.0
Feb	1991	—	121.5	597.70	133.0
Mar	1991	105.8	119.1	—	133.3
Apr	1991	—	117.6	—	133.3
May	1991	—	117.8	592.00	133.4
June	1991	106.0	120.4	—	133.4
July	1991	—	120.4	—	133.5 R
Aug	1991	—	119.9	599.50	133.8
Sept	1991	106.6	118.3	—	134.2
Oct	1991	—	118.7	—	134.3
Nov	1991	—	120.6	612.20	134.4
Dec	1991	107.6	121.2	—	134.5
Jan	1992	—	120.9	—	134.7
Feb	1992	—	120.9	625.20	134.7
Mar	1992	107.6	120.0	—	134.8
Apr	1992	—	120.5	—	134.8
May	1992	—	122.4	624.80	135.0
June	1992	107.3	124.6	—	135.0

P = Preliminary **R** = Revised since last month

1 Monthly data for the period 1967 to 1990 appears in NUEXCO Monthly Report 278.

2 Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1989 to June 1990 = 100.0). Figures shown at end of quarter represent quarterly average. Base year changed from 1980/81 in Monthly Report 286.

3 Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (CATALOGUE No. 6411.0).

4 Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (CATALOGUE No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

5 Australian Bureau of Statistics, Canberra: "Average Weekly Earnings, States & Australia" (CATALOGUE No. 6302.0).

GOVERNMENT STATISTICS

Canada

Wage-earner Data:
Average Hourly Earnings (C\$)¹

Year	Period	Industrial Products Price Index: All Commodities ² (1986 = 100) ³	Consumer Price Index: All Items (1986 = 100) ³	Uranium Mines (SIC 057)	Metal Mines (SIC 061)	Mines, Quarries and Oil Wells (SIC 061-092)	Metal Rolling, Casting and Extruding (SIC 299)	Chemicals and Chemical Products Industries (SIC 371-379)
1980	Avg.	75.9	67.2	—	—	—	—	—
1981	Avg.	83.6	75.5	—	—	—	—	—
1982	Avg.	89.0	83.7	—	—	—	—	—
1983	Avg.	92.1	88.5	17.22	15.27	14.58	10.17	11.03
1984	Avg.	96.3	92.4	17.89	16.25	15.29	10.59	11.67
1985	Avg.	99.0	96.0	18.53	16.73	15.83	11.54	12.14
1986	Avg.	100.0	100.0	19.38	16.88	15.98	12.20	12.65
1987	Avg.	102.8	104.4	20.12	17.16	16.25	13.04	13.22
1988	Avg.	107.2	108.6	20.91	18.60	17.22	13.58	13.72
1989	Avg.	109.4	114.0	21.97	19.60	18.37	14.02	14.31
1990	Avg.	109.7	119.4	22.90	20.53	19.11	14.88	15.13
1991	Avg.	108.6	126.2	24.35	22.44	20.59	14.94	16.22
Jan	1991	111.1	125.0	23.79	21.53	19.94	14.86	15.51
Feb	1991	110.6	125.0	25.23	22.32	20.39	14.82	15.84
Mar	1991	109.8	125.5	24.19	22.17	20.57	15.50	16.19
Apr	1991	109.1	125.5	24.77	22.20	20.57	14.76	16.28
May	1991	108.6	126.1	24.38	21.86	20.51	15.04	16.26
June	1991	108.5	126.7	23.58	21.96	20.10	14.67	16.25
July	1991	108.2	126.8	24.70	22.52	20.17	14.52	16.07
Aug	1991	107.8	126.9	23.78	22.32R	20.96	14.72	16.01
Sept	1991	107.6	126.7	24.23	22.43	20.61	14.95	16.40
Oct	1991	107.3	126.5	24.40	22.42	20.80	15.13	16.43
Nov	1991	107.3	127.0	24.58	22.68	21.05	15.00	16.46
Dec	1991	107.2	126.4	24.53	22.80	21.39	15.30	16.92
Jan	1992	107.2	127.0	24.79	22.78	21.48	15.78	16.91
Feb	1992	108.1	127.1	24.42	22.60	21.41	16.18	16.82
Mar	1992	108.2	127.5	24.92	22.92	21.37	16.31	16.62
Apr	1992	108.1	127.6	** ⁵	23.39	22.04	16.60	16.69
May	1992	108.6R	127.8	**	23.22R	21.47R	16.64R	16.78R
June	1992	108.8R	128.1	**	23.33P	21.48P	16.86P	17.03P
July	1992	108.9	128.4	**	—	—	—	—

P = Preliminary R = Revised since last month

¹ Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (CATALOGUE 62-01). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1990 is found in NUEXCO Monthly Report 278.

² New Base Year of 1986 as of NUEXCO Monthly Report 266. Previous Base Year was 1981.

³ New Base Year of 1986 as of NUEXCO Monthly Report 264. Previous Base Year was 1981.

⁴ Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1990 is found in NUEXCO Monthly Report 278. SIC number revisions shown starting in Monthly Report 287.

⁵ As of April 1992, Statistics Canada no longer provides specific information on uranium mine wages. The data has been included with Metal Mines (SIC 061).

GOVERNMENT STATISTICS

South Africa

Year	Period	Average Declared Working Costs per Metric Ton of Gold Ore Milled ¹ (Rand)	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled ² (March 1982 = 100)	Consumer Price Index ³ (1990 = 100)	Production Price Index All Groups ⁴ (1990 = 100)	Total Employment in Mining and Quarrying ⁵	Total Salaries and Wages in Mining and Quarrying ⁶ (1,000 Rand)
							Annual Total⁶
1980	Avg.	35.50	—	25.5	27.7	709,042	2,237,689
1981	Avg.	41.87	—	29.4	31.5	722,918	2,756,928
1982	Avg.	47.23	103.9	33.7	35.9	702,041	3,181,584
1983	Avg.	51.88	115.0	37.8	39.7	700,901	3,563,282
1984	Avg.	58.95	130.3	42.2	43.0	711,511	4,134,390
1985	Avg.	68.70	151.7	49.1	50.3	724,587	4,778,612
1986	Avg.	80.18	177.9	58.2	60.1	756,637	5,767,950
1987	Avg.	95.01	223.1	67.6	68.5	751,864	6,911,395
1988	Avg.	106.69	241.1	76.2	77.5	705,355	7,774,054
1989	Avg.	116.65	273.0	87.4	89.3	700,360	8,833,934
1990	Avg.	129.37	305.3	100.0	100.0	677,742	10,193,209
1991	Avg.	136.06	322.4	115.1	111.4	630,722	10,934,073
							Monthly Total
Jan	1991	—	—	107.7	108.6	648,944	935,839
Feb	1991	—	—	109.0	109.0	650,948	893,373
Mar	1991	137.66	323.82	110.0	108.2	651,843	924,930
Apr	1991	—	—	111.5	108.8	639,939	887,722
May	1991	—	—	113.2	109.8	630,481	887,107
June	1991	134.65	317.23	114.0	110.3	640,908	890,595
July	1991	—	—	115.5	111.2	637,581	881,182
Aug	1991	—	—	117.1	112.0	633,699	963,710
Sept	1991	137.11	329.05	118.7	113.2	639,535	1,014,424
Oct	1991	—	—	119.8	114.8	584,435	860,529
Nov	1991	—	—	120.9	115.3	602,461	853,864
Dec	1991	134.81	319.33	123.8	115.8	602,486	940,798
Jan	1992	—	—	125.1	115.9	622,143	953,440
Feb	1992	—	—	126.2	116.3	618,114	925,858
Mar	1992	139.69	331.46	127.3	116.9	620,773 R	954,628 R
Apr	1992	—	—	128.9	118.4	608,027	941,295
May	1992	—	—	129.9	119.4	—	—
June	1992	140.69	334.63	131.2	120.5	—	—
July	1992	—	—	132.4	—	—	—

P = Preliminary **R** = Revised since last month

¹ Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in NUEXCO Monthly Report 278.

² Page 16 of Report 178 contains description and calculation of index.

³ Central Statistical Service, Pretoria: All income groups-weighted average. Historical Data by month appears in NUEXCO Monthly Report 278.

⁴ Central Statistical Service, Pretoria: All commodities for consumption in South Africa. Base Year changed from 1985 to 1990 in NUEXCO Monthly Report 284.

⁵ Central Statistical Service, Pretoria: Historical Data by month appears in NUEXCO Monthly Report 236.

⁶ Annual total is shown, rather than monthly average, for indicated year.

GOVERNMENT STATISTICS

United States

		Producer Price Index				Gross Average Hourly Earnings of Production or Non-supervisory Workers (US\$) ¹					
		Industrial Commodities (1982=100)	All Commodities (1982=100)	Consumer Price Index (1982-84 = 100)	GNP Implicit Price Deflator (1987 = 100)	GDP Implicit Price Deflator (1987 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)	
Year	Period										
1980	Avg.	88.0	89.8	82.4	71.7	71.7	10.26	10.63	8.31	6.94	
1981	Avg.	97.4	98.0	90.9	78.9	78.9	11.55	11.98	9.12	7.62	
1982	Avg.	100.0	100.0	96.5	83.8	83.8	12.31	12.93	9.96	8.21	
1983	Avg.	101.1	101.3	99.6	87.2	87.2	12.58	13.43	10.58	8.66	
1984	Avg.	103.3	103.7	103.9	91.1	91.0	13.05	13.43	11.07	9.04	
1985	Avg.	103.7	103.2	107.6	94.4	94.4	13.38	13.74	11.57	9.46	
1986	Avg.	100.0	100.2	109.6	96.9	96.9	12.46	13.48	11.98	9.65	
1987	Avg.	102.6	102.8	113.6	100.0	100.0	12.52	12.98	12.37	9.88	
1988	Avg.	106.3	106.9	118.3	103.9	103.9	13.24	13.26	12.71	9.79	
1989	Avg.	111.6	112.2	124.0	108.5	108.5	13.59	13.72	13.09	10.05	
1990	Avg.	115.8	116.3	130.7	113.2	113.2	14.10	14.36	13.54	10.32	
1991	Avg.	116.5	116.5	136.2	117.8	117.8	14.89	14.64	14.07	10.73	
Jan	1991	119.3	119.0	134.6	—	—	14.73	14.63	13.85	10.60	
Feb	1991	117.2	117.2	134.8	—	—	14.80	14.55	13.81	10.59	
Mar	1991	115.6	116.1	135.0	116.4	116.5	14.93	14.55	13.85	10.55	
Apr	1991	115.6	116.0	135.2	—	—	14.85	14.56	13.96	10.63	
May	1991	116.1	116.5	135.6	—	—	14.79	14.52	14.01	10.66	
June	1991	116.1	116.4	136.0	117.4	117.5	14.88	14.51	14.05	10.74	
July	1991	116.0	116.1	136.2	—	—	15.09	14.56	14.16	10.77	
Aug	1991	116.3	116.2	136.6	—	—	14.82	14.64	14.06	10.78	
Sept	1991	116.3	116.1	137.2	118.2	118.2	15.04	14.59	14.21	10.84	
Oct	1991	116.7	116.4	137.4	—	—	14.94	14.75	14.25	10.78	
Nov	1991	116.7	116.4	137.8	—	—	15.29	14.89	14.27	10.88	
Dec	1991	116.1	115.9	137.9	118.9	118.9	15.13	14.87	14.34	10.96	
Jan	1992	115.7	115.6	138.1	—	—	15.06	14.74	14.30	10.90	
Feb	1992	116.0	116.0	138.6	—	—	15.22	14.67	14.29	10.90	
Mar	1992	115.9	116.1	139.3	119.8	119.8	15.05	14.57	14.26	10.92	
Apr	1992	116.3	116.3	139.5	—	—	15.02	14.61	14.39	10.98	
May	1992	117.2	117.1	139.7	—	—	15.09R	14.76R	14.39R	10.99R	
June	1992	118.0	117.8	140.2	120.6	120.6R	15.20P	14.67P	14.38R	11.06	
July	1992	118.1	117.8	140.5	—	—	—	—	14.51P	11.05P	

P = Preliminary **R** = Revised since last month

¹ US Bureau of Labor Statistics, Washington, DC: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in NUEXCO Monthly Report 278.

² US Bureau of Labor Statistics, Washington, DC: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in NUEXCO Monthly Report 278.

³ US Department of Commerce, Washington, DC: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The Gross National Product (GNP) and Gross Domestic Product (GDP) Implicit Price Deflators (IPD) are published quarterly, and seasonally adjusted. Historical data for the GNP IPD is presented in Report 278. GDP IPD information first published in NUEXCO Monthly Report 288. GNP IPD Base Year change from 1982 to 1987 in NUEXCO Monthly Report 284.

⁴ US Bureau of Labor Statistics, Washington, DC: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in NUEXCO Monthly Report 278.

GOVERNMENT STATISTICS

Uranium Deliveries To The European Community¹

— Compiled from data published by the Euratom Supply Agency —

Year	Volume of Deliveries to the EC ² (MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts ³ Average Price		Spot Contracts ³ Average Price	
			in ECU per pound U ₃ O ₈	in US Dollars per pound U ₃ O ₈	in ECU per pound U ₃ O ₈	in US Dollars per pound U ₃ O ₈
1977	n/a	n/a	n/a	n/a	n/a	\$41.00
1978	n/a	n/a	n/a	n/a	n/a	\$43.00
1979	10,000	n/a	n/a	n/a	n/a	\$44.50
1980	8,600	n/a	n/a	\$36.00	n/a	\$35.00
1981	13,000	less than 10	n/a	\$33.25	n/a	\$28.00
1982	12,500	less than 10	ECU 32.25	\$32.00	ECU 24.25	\$24.00
1983	13,500	less than 10	ECU 34.75	\$31.00	ECU 26.00	\$23.25
1984	11,000	less than 10	ECU 37.75	\$29.75	ECU 24.50	\$19.25
1985	11,000	11.5	ECU 38.00	\$29.00	ECU 19.50	\$15.00
1986	12,000	9.5	ECU 31.50	\$31.00	ECU 18.00	\$17.75
1987	14,000	17.0	ECU 28.25	\$32.50	ECU 15.00	\$17.25
1988	12,500	4.5	ECU 26.92	\$31.82	ECU 13.65	\$16.13
1989	13,500	11.5	ECU 26.63	\$29.35	ECU 11.04	\$12.19
1990	12,800	16.7	ECU 23.08	\$29.39	ECU 7.60	\$ 9.68
1991	12,900	13.0	ECU 21.05R	\$26.09	ECU 7.30R	\$ 9.05

P = Preliminary **R** = Revised since last month

¹ The twelve European Community member nations are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

² The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

³ For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar. Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

GOVERNMENT STATISTICS

US Uranium Marketing Data

— Compiled from data published by the US Energy Information Administration ¹ —

Year	Total Production (million pounds U ₃ O ₈)	Deliveries to Domestic Utilities From US Suppliers ² (million pounds U ₃ O ₈)	Average Price of Delivered Uranium ³ (\$/lb. U ₃ O ₈)	Quantity of Uranium Imported (million pounds U ₃ O ₈)	Average Price of Imported Uranium (\$/lb. U ₃ O ₈)	Quantity of Uranium Exported (million pounds U ₃ O ₈)
1976	25.5	27.6	\$16.10	3.6	n/a	1.2
1977	29.9	27.8	\$19.75	5.6	n/a	4.0
1978	37.0	31.6	\$21.60	5.2	n/a	6.8
1979	37.5	33.0	\$23.85	3.0	n/a	6.2
1980	43.7	35.0	\$28.15	3.6	\$43.10	5.8
1981	38.5	32.6	\$34.65	6.6	\$32.90	4.4
1982	26.9	23.5	\$38.37	17.1	\$25.19	6.2
1983	21.2	24.2	\$38.21	8.2	\$26.16	3.3
1984	14.9	22.5	\$32.65	12.5	\$21.86	2.2
1985	11.3	21.7	\$31.43	11.7	\$20.08	5.3
1986	13.5	18.9	\$30.01	13.5	\$20.07	1.6
1987	13.0	20.8	\$27.37	15.1	\$19.14	1.0
1988	13.1	17.6	\$26.15	15.8	\$19.03	3.3
1989	13.8	18.4	\$19.56	13.1	\$16.75	2.1
1990	8.9	20.5	\$15.70	23.7	\$12.55	2.0

P = Preliminary **R** = Revised since last month

¹ Sources: 1976-1983: US Department of Energy/Energy Information Administration, *Survey of United States Marketing Activity*.
1984-1990: Energy Information Administration, *Uranium Industry Annual*.

² Data for 1976-1981 includes both domestic utilities and agents.

³ Includes imports by domestic utilities and domestic suppliers.

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